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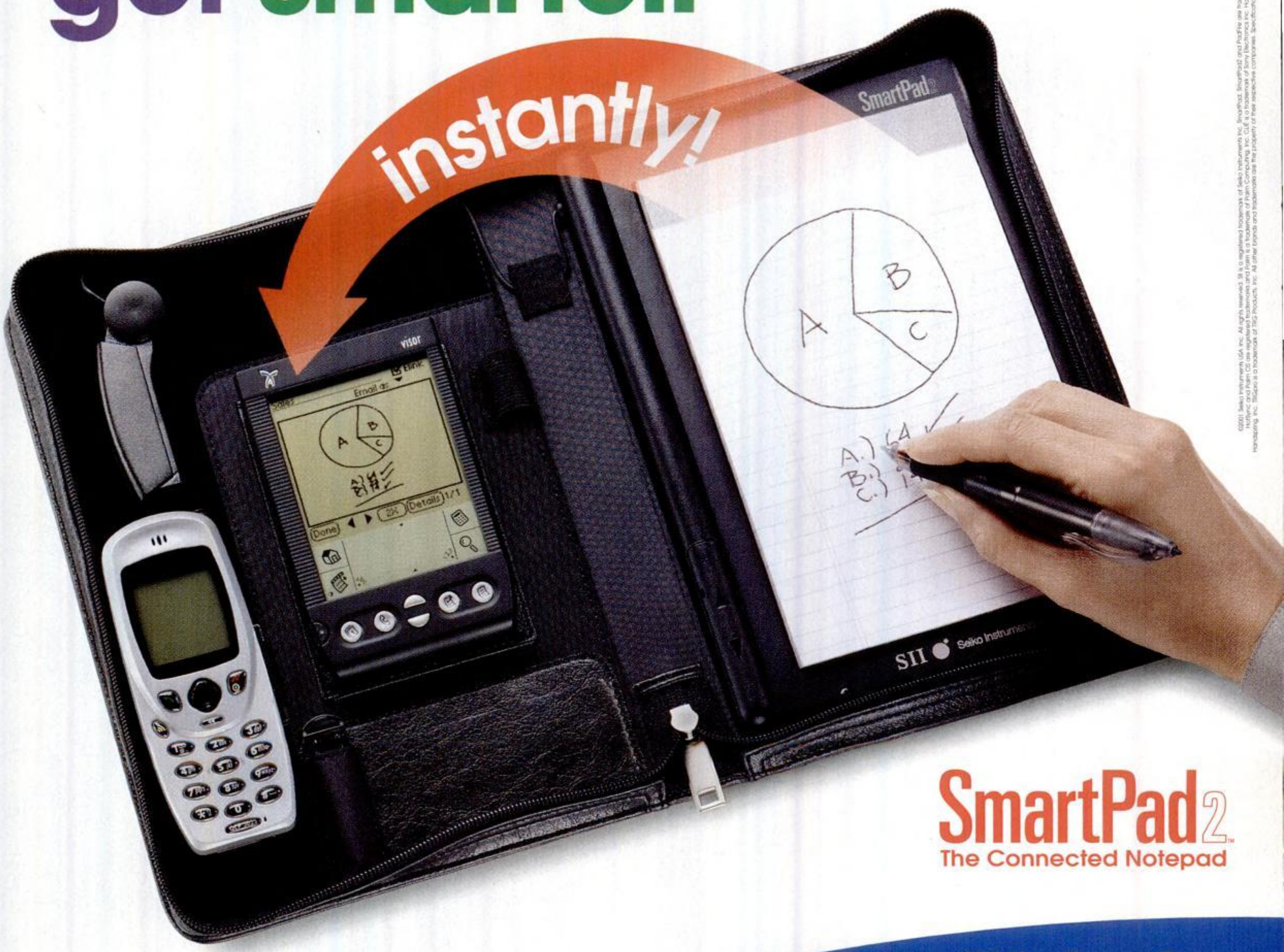

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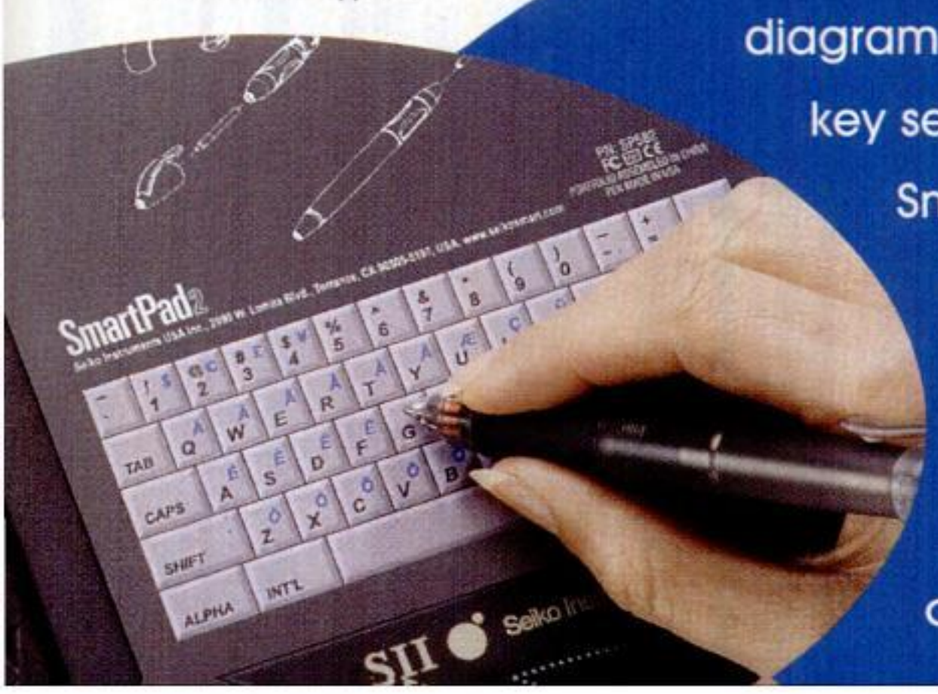

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Release Notes

The operative word is "dream"

If you bought this particular issue to read an article on "reasonable" dream machines, you're about to be profoundly disappointed. There's nothing reasonable, cautious, or even remotely logical about Dream Machines 2001. In fact, quite the opposite. We went crazy. We leapt off the deep end. We asked ourselves "How can we configure the most outrageous super-PCs possible?" Then we multiplied the answer by a factor of 10.

They're called "dream"machines for a reason, people! We spent a grand total of $30,582 on three computer configurations so you wouldn't have to.

Here's the deal: Every year, we publish four annual articles. The first—Ultimate Upgrade Bible—appears in July or August. In this article, we provide you with reasonable, sober advice on which upgrade components will best serve your PC.

Up next is September's Dream Machine article. This is *not* an advice feature. In fact, we recommend that you refrain from any attempt to recreate a Dream Machine at home. No, the Dream Machine article is a pure technology demonstration, evidence of what can happen when a mentally unstable group of editors petitions PC vendors for gratis hardware: "What? You'll give us 256MB of DDR memory for free? Can we have 512MB? We can? Can we have 1024MB? We can? Can we..."

And so the conversations go. In a nutshell, you want to see the most outrageous computer configurations possible, and we have the resources to oblige. To ignore our responsibility as happiness-enablers would be tantamount to, well, "Maximum BS."

If you're looking for more reasonable content, stay tuned for the other two annual features: In the December issue we give you Gear of the Year, an article that names the best hardware components of the year, paying due attention to price considerations. And finally, in the January issue (which hits newsstands in December), we detail the building of the "Mini Dream Machine," the best machine possible within a reasonable price limit.

For now, we give you Dream Machines 2001, our homage to reckless abandon.

—JON PHILLIPS

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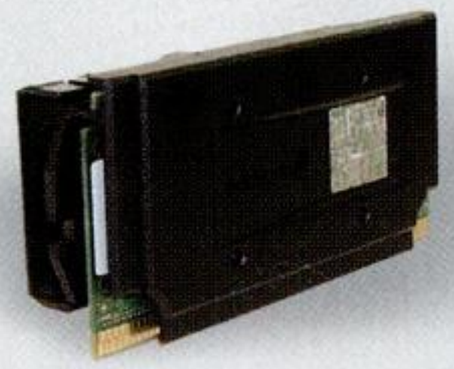

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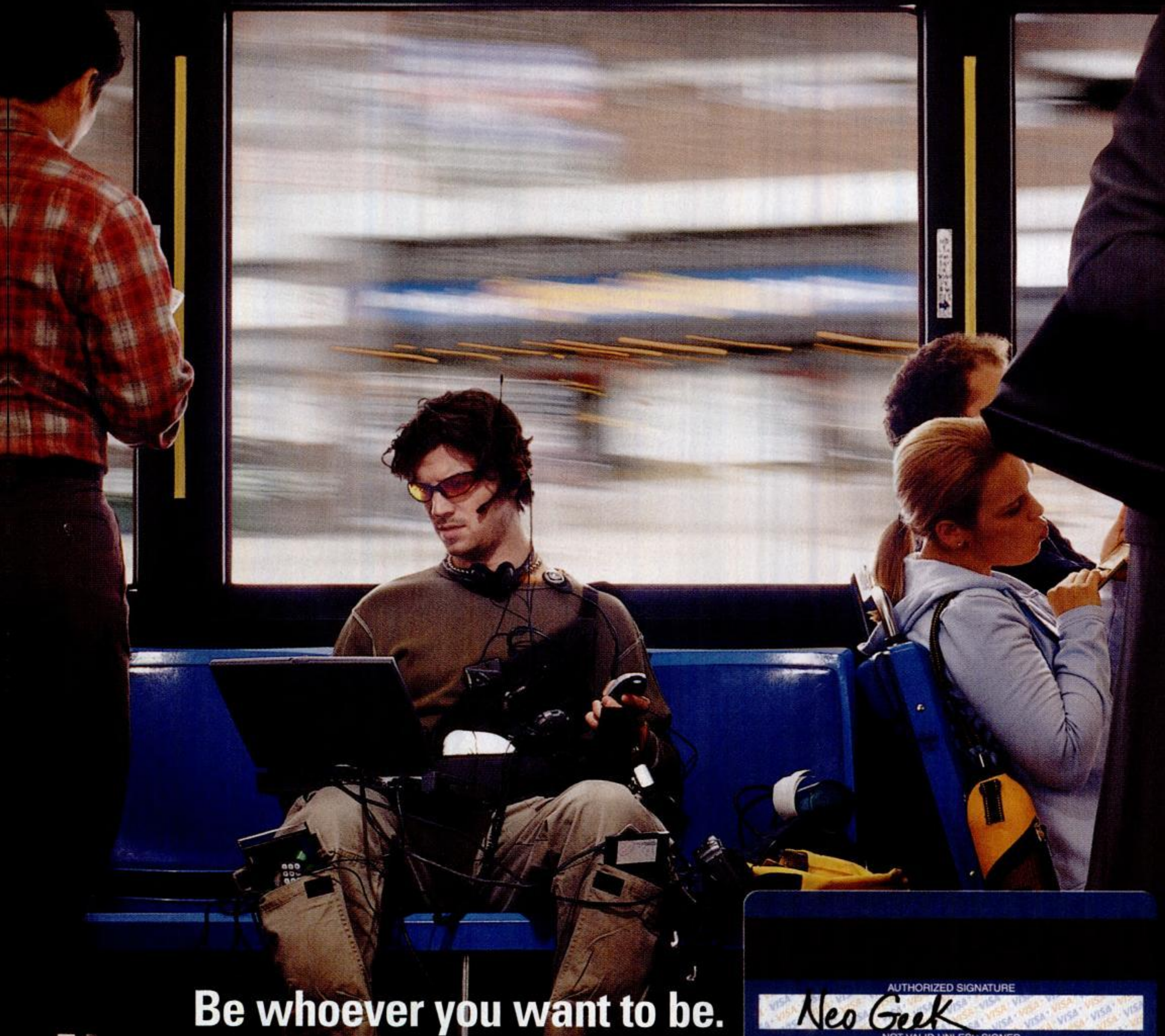

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ALSO:

40 Beyond the X-Rating
Expect to see more than just higher speeds in the upcoming recordable CDs and DVDs. Here's our guide to the new formats just around the corner.

50 MP3 Survival Guide
The glory days of *Napster* may be a thing of the past, but other music file-sharing applications are primed and ready to take *Napster*'s place. Find out about the five apps that most impressed us, and get the pros and cons on the competing codecs.

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In/Out

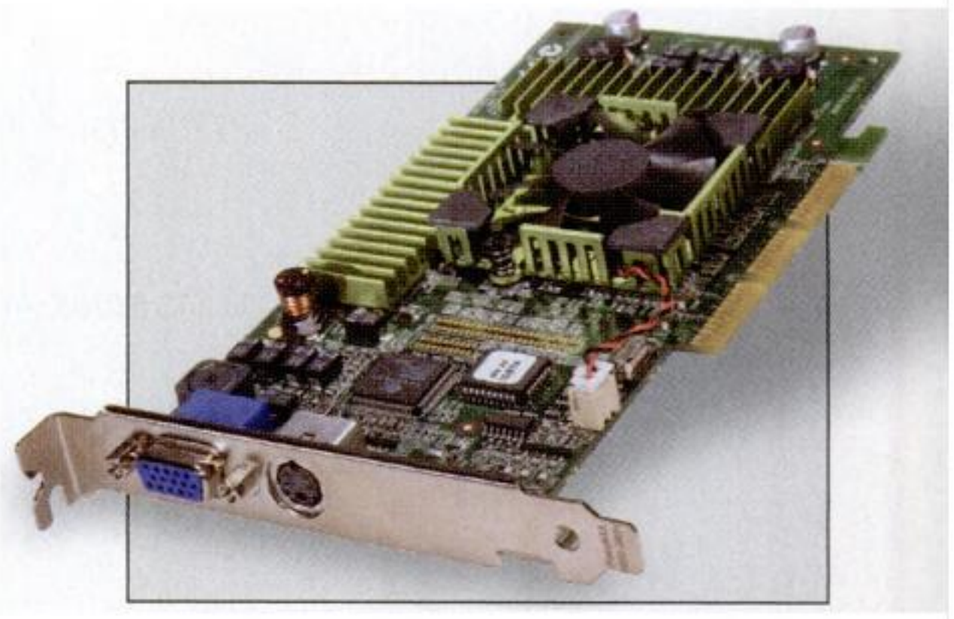
You write, we respond

(Color) Blinded by the . . . Sorry, What Was I Saying?

Will Smith seems to be suffering from CRS (Can't Remember, uhh... Stuff). In his review of the Elsa Gladiac 920 vs. the 3D Prophet (August 01), he first writes that the Gladiac is green, but in the closing paragraph he states that the Gladiac is blue. The picture clearly shows he was right the first time. Is he color blind?

—DEAN CLAYPOOL

TECHNICAL EDITOR WILL SMITH RESPONDS: Though a technically correct description of the Elsa card would have pegged it as green, the hard "e" sound of the word "green" would have thrown off the rhyme and meter of the entire paragraph, turning a carefully sculpted piece of prose into an abomination of the English language and a threat to the continued integrity of *Maximum PC* as a bastion of literary excellence. Call it an error; call it color-blindness. I call it a last desperate stand to preserve the beauty of our mother tongue.



Is it green? Is it blue? You tell us. We might be too color-blind to tell the difference. The 15-pin connector is blue, right?

XP EXCELLENCE!

In the article titled "The Light and Dark Sides of Windows XP" (July 01), you neglected to mention one of XP's most welcome features: faster boot times. Microsoft's performance goals for Windows XP boot times are: cold boot to usable state—30 seconds; resume from Hibernate—20 seconds; resume from Standby—5 seconds. These figures seem a little optimistic, but they're easily attainable through XP's kernel enhancements, such as the BIOS's Simple Boot Flag that (among other things) tells the BIOS what devices need to be configured upon boot, so it won't waste time configuring resources such as I/O ports, memory windows, and IRQs if Windows is going to set them anyway.

In addition, the Windows XP boot loader has been rewritten to load larger chunks of memory and to rearrange files on the computer's hard drives for more efficient file access. XP prioritizes driver loading to get the user up to a usable desktop as quickly as possible, and while it loads NDIS and other network drivers, the system doesn't wait for them to load completely before proceeding. Protocol binding for network devices is done in parallel, which can significantly improve boot time, especially when negotiating with hubs and routers.

—Oliver Aaltonen

On a hunch, we asked Oliver if he's an XP beta tester. We win this month's Sherlock Holmes Award. —Ed.

In the Windows XP article, a few of the traits you listed as part of the OS's "dark side" aren't so bad at all. For example:

■ Product Activation: Since when is preventing piracy a bad thing? Piracy forces up the price of software, and I applaud Microsoft in its attempt to stop people from ripping them off. Of course, since Microsoft will end up saving money, it should drop the price of the software.

■ MP3 Antagonism: There are dozens of programs that encode music, some of them for free. If someone wants to encode MP3s at higher bitrates, they can use one of the programs out there dedicated to this. Let us not forget that XP is an operating system first and a multimedia tool second.

■ Fantasy Hardware Requirements: XP is geared toward those with high-end machines that need high-end operating systems. Those who were scared off by Windows 2000's system requirements will probably ignore XP because they know their system won't be able to handle it. But even year-old systems will be able to handle XP's "hefty" requirements.

■ Wasted Money, Wasted Time: On this, I will agree with you guys. Windows ME is a joke.

If these minor things are all you can find wrong with Windows XP, I'll be first in line on October 25th (hopefully) to pick up a copy.

—Jon Marier

In the "The Light and Dark Sides of Windows XP," you show a picture of a silver Windows XP countdown clock sent to you by Microsoft (according to the article). I have been trying to find this collector's item myself but am not having much luck with Microsoft, whose sales people find it hard to deal with the fact that the clock isn't really a product that they're selling. Can you give me more information as to the group or part of Microsoft that sent it to you?

(continued on p12) ▼

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▲ *(continued from p10)*
Maybe I could contact them. I'd appreciate any help you can provide.

—John Peloquin

TECHNICAL EDITOR WILL SMITH RESPONDS: Unfortunately, John, big-ticket memorabilia such as the Windows XP countdown clock are only made available to highly respected journalists. Which, of course, makes it even weirder that *we* got one.

Seriously, though, we did query Microsoft about how the public at large can get their hands on these things, but our calls and e-mails were fruitless. We took a closer look at the clock and found that, aside from the Windows XP logo on the front, the only distinguishing mark on it is a stamp indicating that it was made in China. Thinking that a more telling hint about the clock's origin might be found inside, we pried open the silvery plastic case to see what makes it tick. Inside, we found nothing more than a lone Powercell AA battery and a puff of smoke—alas, no distinguishing marks or even familiar-looking clock circuitry. This leads us to believe that both the XP Doomsday clock and Windows XP itself were created by aliens. Obviously, the "Powercell" battery is a highly sophisticated alien power source, and the puff of smoke is some sort of super-molecular computer that we have no chance of ever understanding.

If you have any other questions about this topic, please direct them to billg@microsoft.com.

PERHAPS YOU JUST DON'T KNOW DICK

We've gotten quite an earful o'er the past few months from folks who have issues with our old pal Dick Matthews, MCSE. This month, we're happy to report that we're receiving a growing number of pro-Dick letters. We took them over to Dick's office to show him that he's got an expanding fan base, but we accidentally interrupted him in the middle of his "Yoga Zone" videotape, so now we have to hide under our desks until he's a little less steamed.

Wow, I love this guy! Reading [Dick Matthews'] column is equivalent to four hours on the punching bag at the gym. I've had to work with more than a few idiots, and Dick's column is a great way to vent my frustrations with them all. Of course, it would be politically incorrect for me to vent on my clients, but Dick does a great job of that for me. Bravo, Dick! Hey, maybe you could write an article on all those single-celled users who keep referring to the CPU case as the hard drive! Or all those executives who think their OS is named after their version of MS Office!

—Thomas Hammel, IT Specialist, MCP, MCSE, IBM Global Services

MORE EFFECTIVE PROTECTION—AND DESTRUCTION

Regarding "Protect and Destroy" (July 01): Any discussion of Windows encryption tools should always include mention of *ScramDisk* (**www.scramdisk.clara.net**). *ScramDisk* offers nine encryption algorithms, Blue Screen password entry, and partition encryption. Best of all, a *ScramDisk* volume looks exactly like any other Windows drive, which means maximum application compatibility. What more could you ask for?

—David Gasaway

A worthy addition to the arsenal of those desiring security and privacy is a free program called *BCWipe* from Jetico (**www.jetico.com**). After installing *BCWipe*, just right-click a file to access the option "Delete With Wiping." This wipes a file completely off your drive, rather than just moving it to the recycle bin. You can also right-click a drive letter and wipe all the free space on a particular drive, along with the swap file, unused directory entries, and file slack. All wipes are done in multiple passes.

—Colin McKay

IRDA INTEREST

I read your review of the Toshiba Satellite (July 01) and took note of the special attention you gave to the fact that this satellite has a SmartMedia port but no IrDA port. Besides moving information to and from PDAs, what is IrDA really good for? Are we really missing anything by not having the IrDA feature on a machine? How fast is it, realistically, and does it have any functional uses beyond its "neato" factor?

—Joshua Kuhne

SENIOR EDITOR GORDON MAH UNG REPLIES: It's true that IrDA has thrashed around for many years as a semi-useless transfer protocol, and the two applications it was most often pimped for—printing and networking—haven't exactly panned out. Few printers have been equipped with IrDA, and its line-of-sight requirements have made it all but useless for any real wireless networking. But we think IrDA has found its niche on modern PDAs and in many wireless phones—both devices that can very viably be used with notebook computers. The only competing standard would be Bluetooth, which will probably take longer than an elephant to gestate.

PCI-XAMINED

Given the complexity of AGP hardware and driver issues, wouldn't it make sense for the industry to pursue a PCI-X video solution? At 133MHz, PCI-X has the speed of AGP without the complicated, burdensome architecture of AGP. AGP texturing was a stillborn technology; its major advantage has always been the increased bus speed, not the texture transfer. With the advent of hidden surface-removal support (in the Kyro II chipset and forthcoming chipsets from nVidia and ATI), it's clear that companies are more concerned with easing the local memory bandwidth bottleneck. And today's 64MB videocards still have plenty of room to spare for real-world modern games (don't give me any of that "we'll-need-it-in-the-future" crap we heard about AGP for four years). Are there hidden costs, financial or otherwise, in the implementation of PCI-X compared to AGP? Server boards have these slots all over the place. I've gotta think that because it's backward-compatible with PCI, it couldn't be hard to implement.

—Adam Yulish

TECHNICAL EDITOR WILL SMITH REPLIES: It wouldn't make sense for the industry to pursue a PCI-X video solution because... well, how many desktop machines have you seen with PCI-X slots? Despite the fact that PCI-X is backward-compatible with PCI, putting a PCI-X card into a PCI slot isn't going to get you PCI-X level performance.

Both the PCI-X and AGP 4x specs provide components with about 1GB/sec of bandwidth, so there's no real performance reason to move away from AGP 4x to PCI-X. Additionally, there's a massive installed base of AGP motherboards—so why would the graphics card industry support PCI-X motherboards? Unless, of course, you want to use a PCI-X adapter in a standard PCI-compliant motherboard, which will get you a whopping 133MB/sec of bandwidth. Current games don't fully utilize the 1GB/sec of bandwidth that

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AGP 4x provides, but I'm certain you'd see a performance hit if you were using a PCI-X GeForce3 in a 133MB/sec PCI slot.

What we'll see in the near future is graphics accelerators that store vertex information in main system memory and access it via the AGP bus. Because the vertex data is easily compressed, no performance loss is incurred by using system memory for vertex data, and a sizeable chunk of the board's internal memory bandwidth can be saved for texturing, which is more bandwidth-intensive.

Changing just for the sake of changing something is never a good idea.

DVD/CD COMBOS—YEA OR NAY?

I recently purchased a combination Ricoh CD-burner and DVD player because *Maximum PC* gave it a 9/Kick Ass rating. I'm generally happy with the burner, but I was a little disturbed to read in the August 2001 issue an item in which you described CD burners with DVD as overrated. Which is it, guys? Was my purchase a kick-ass piece of hardware or an overrated waste of my money?

—Robert Case

LOGAN DECKER RESPONDS: The answer is (a) a kick-ass piece of hardware. While most combo drives tend to be compromised in terms of speed and functionality, the Ricoh 12/10/32/8 is a strong exception to the rule. It was not only one of the first combo drives to offer its own buffer-underrun prevention technology, but it also matched the speed of dedicated 12x CD-burners from TDK and Plextor. The biggest surprise was that it beat the crap out of the Plextor in digital audio extraction. Fast and accurate DAE is something we never would have anticipated from a DVD/CD combo drive.

We should add that just because we called combo drives "overrated" doesn't mean they can't be convenient or even ideal for some people. That's why we called them "overrated" instead of "totally useless."

FASTEST HARD DRIVE EVER

I was reading through yet another kick-ass edition of *Maximum PC* when I caught a funny typo. In "Your Guide to SpecSpeak" (August 01), it states that hard-drive transfer speeds are "usually expressed in gigabytes per second," and that the sustained transfer rate of the hard drive shown is 37GB/sec. Now, I'm no rocket scientist, but 37GB/sec? NICE! If you know how to get ahold of this type of über hard drive, please let me know ASAP!

—Nick Dumke

SENIOR EDITOR GORDON MAH UNG RESPONDS: Doh! Obviously, we were expressing our desires and not reality when we described a drive with 37GB/sec transfer speeds. Hard-drive transfer speeds are actually expressed in MB/sec, not GB/sec.

COVER CHARGE

In the July issue, you explained that two different covers had been created for the magazine, and that you would find out which cover sold the most magazines and let us know. I think you forgot something: Us (the subscribers)! You never asked *us* which we liked better. After we subscribe, is that it? Do our opinions no longer count? It seems to me our opinions should count very highly, but not once was that mentioned.

—David McManis

EDITOR-IN-CHIEF JON PHILLIPS REPLIES: First and foremost, our covers are designed to generate newsstand sales, not subscription sales. Sure enough, our subscribers are very important to us—in crass, quantifiable terms, our subscribers are 12 (and sometimes 24) times more important than our casual newsstand buyers (wink, wink). But conventional wisdom says that people base their subscription decisions on a magazine's page-by-page content and not on what happens to be on the magazines' covers. Still, we don't want our covers to be pure, hard-sell sales devices (like, say, cereal boxes), so we try to make them as artistically appealing as possible so that readers will be compelled to display the magazines with pride.

To respond to the basic question—"After we subscribe, is that it?"—the answer is no. We periodically survey subscribers to gauge their specific tastes in content. The split-cover run for July, however, was designed to gauge the tastes of newsstand readers. BTW: It'll be at least another two months before we have conclusive results from the July cover test.

VERDICT VAGUERIES

I just read the GeForce3 reviews (Aug 01), and I'm pleased to see that the previous ratings policy of picking a "winner" on the basis of statistically insignificant benchmark differences has been abandoned! Under the former scheme, the Elsa would have been proclaimed the champion, having "smashed" the Hercules by mere tenths of a frame per second. An interesting dilemma arises, however, when you issue identical Perfect 10 scores to two GeForce3 boards from two different vendors, since both cards may prove in the long run to have nearly identical performance. I'd then argue that these boards are "average" in the GeForce3 category and deserving of a 5 rather than a 10—lest you get trapped in an Olympic-style scoring purgatory where a 9.5 out of 10 score is considered a disaster.

—Jeff Dillon

REVIEWS EDITOR ROB PRATT RESPONDS: You've hit on a dilemma, namely, How do we reward cutting-edge technology when several hardware makers offer it simultaneously? Since all GeForce3-based videocards we've tested use virtually identical circuit-board designs and deliver virtually identical performance, we really can't make meaningful distinctions. Believe me, we've tried! Taking the videocard category as a whole, however, GeForce3-based cards "demonstrate not only decisive superiority over other products" but also deliver "groundbreaking new features"—our twin criteria for a 10 verdict, as spelled out in the February 2001 issue. Fortunately, few new technologies show up in so many identical implementations as the GeForce3. And, no doubt, someone will soon deliver a new twist on a GeForce3 videocard that'll let us declare bona fide winners and losers. ■

LETTERS POLICY: MAXIMUM PC invites your thoughts and comments. Send them to input@maximumpc.com. Please include your full name, town, and telephone number. Letters may be edited for space and clarity. Due to the vast amount of e-mail we receive, we cannot personally respond to each letter.

CUT, COPY, PASTE

We must have had dog whistles ringing in our ears when we incorrectly stated several frequencies in the "SpecSpeak" feature in the August 2001 issue. Frequencies listed in MHz are incorrect—and totally inaudible to the human ear, for that matter. Instead, satellite speakers should have a frequency response range of 200Hz to 250Hz. Analog speakers should have a crossover point around 200Hz, and Dolby Digital speakers should have a crossover point at 250Hz.

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Quick Start

The beginning of the magazine, where articles are small

THIS MONTH: GRAPHICS CHIP PREVIEW

ATI's Latest Aims to Knock off GeForce3

We take a sneak peek at the Radeon 8500, and we're impressed with what we see

After a year of silence, we weren't surprised when ATI finally released details on its new graphics chip. After all, the new technology is long overdue. We were, however, surprised by the new chip's specs.

Based on the R200 GPU, the Radeon 8500 is a solid piece of hardware—at least on paper. Full details of the new chip haven't yet been released, but we do know that the R200 will run on a 0.15-micron process and will support DDR memory up to 300MHz (if ATI can obtain such fast memory in quantity). Other interesting hardware features include:

- HDTV output so you can use an HDTV set as a monitor at HD resolutions
- Multiple monitor support
- Enhancements to the HyperZ memory optimization
- Advanced pixel shaders

The R200 has almost twice as many pixel shaders as a GeForce3. Every pixel that goes through the R200's pixel shaders can have up to 22 programmatic instructions run on it, while the GeForce3's pixel shaders are only capable of 12. (In this context, instructions are the little snippets of code that tell the GPU's shaders what to do to the pixels as they move through the 3D pipeline.)

This stained glass demo uses the 8500's pixel shaders, showing both reflection and refraction of four dynamic lights.

So what's the catch? Well, ATI's competition charges that the pixel shader the Radeon uses will require game authors to write different code for different accelerators—exactly the sort of things that APIs like DirectX are supposed to prevent—and thus the ATI chip won't be well supported. ATI says bull to that. The Radeon 8500's feature set will be backward compatible with DirectX 8 and yet support the advanced features of DirectX 8.1. DirectX, by nature, is designed to be backward-compatible, the company says.

ATI says it expects widespread support for the R200 because it has more features than the GeForce3, and developers usually want to use the latest effects to enhance games.

The Radeon 8500 is expected to be on store shelves in time for Christmas for less than $400. Expect to see a full review in an upcoming issue of *Maximum PC*.

And please notice that the chip is not called Radeon II, the name so recklessly bandied about on the Internet.

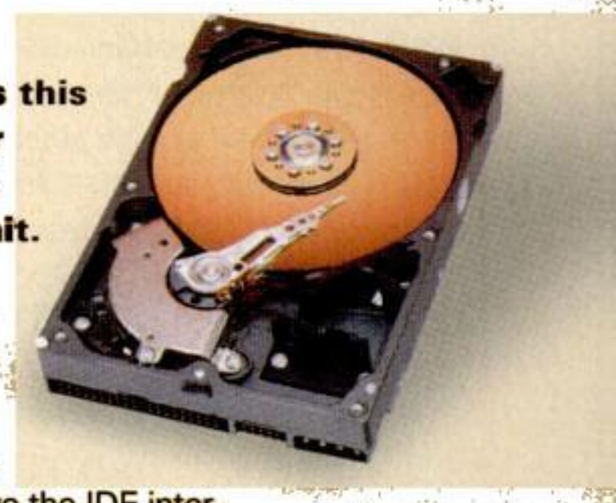
HARD-DRIVE HACK

IDE Barrier Stops PCs at 137GB

A fix is on the way—but only for XP

When hard drives exceed 137GB early next year, the upgrade won't be as easy as dropping in a drive. Because of a hardware and software limitation, almost every PC sold today will be unable to address drives beyond the 137GB IDE limit.

The barrier has to do with the way the IDE interface addresses data locations on a hard disk. The IDE interface represents data addresses with a 28-bit number, which tells your PC the specific cylinder, head, and sector where it can find what it's looking for. Using 28 bits, your hard drive can address up to 268,431,360 data sectors. Since each sector contains 512 bytes, IDE drives can store a grand total of 137.4GB of data before they run out of addresses.



Drives such as this 100GB Maxtor come close to the 137GB limit.

Fortunately, leading hard-drive makers are hashing out an upgraded ATA specification that will allow computers to handle the extra space.

The ATA-6 specification will move the IDE interface to 48-bit addresses, which extends the limit of hard-drive capacities by more than a million-fold to 144 petabytes. Machines running 32-bit OSes will continue to be stuck at 2.1 terabytes.

The new ATA spec will require an updated BIOS and Windows driver upgrade to make a PC work with a large drive. Microsoft, however, only intends to offer the large IDE driver in its upcoming Windows XP.

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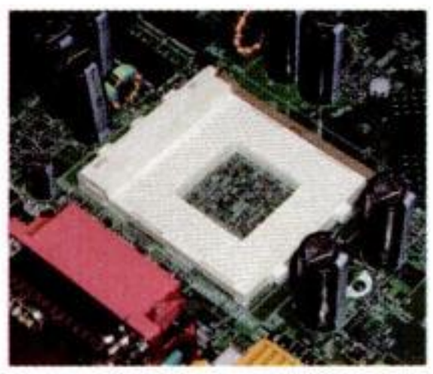
TECHNOLOGY REPORT

State-of-the-Socket Report

Your field guide to contemporary CPU connectors

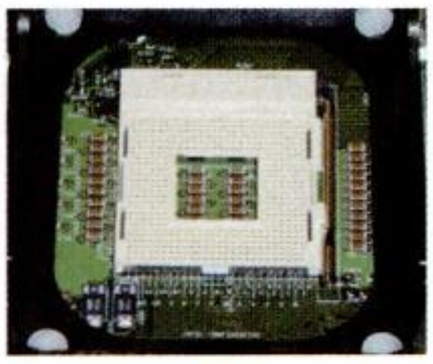
You can't stuff a square peg into a round hole—and you can't fit an Intel CPU into an AMD motherboard socket. So if you're planning your next home-built system, you better be aware of the currently available CPU sockets and the specific chips they support.

Socket: 370
Introduced: 1999
Pin count: 370
Bus speeds: 66MHz, 100MHz, 133MHz
Status: The current home of the Celeron and Pentium III, Socket 370 is expected to take Pentium III up to 1.2GHz and possibly beyond.
Outlook: The actual socket will stay the same, but the underlying chipset support is a moving target. Only the newest chipsets will support the newest CPUs, e.g., only the "b" stepping of the 815E chipset will support the latest P-IIIs. Upgraders should purchase only motherboards or systems that offer P-III "Tualatin" support.



Socket: 462 "A"
Introduced: 2000
Pin count: 462
Bus speeds: 200MHz, 266MHz
Status: The current home of the Duron, the Thunderbird Athlon, the Palomino Athlon, and the Athlon MP.
Outlook: The Socket A platform has been a very stable bet for most computing needs. However, like the S370, changes to CPUs and chipsets will limit your upgrade path. VIA KT133 chipsets, for example, don't fully support the next-generation "Palomino" Athlon, while the AMD760 does. Purchase only boards and systems that support "Palomino." AMD has no plans to dump Socket A for the foreseeable future.

Socket: 423
Introduced: 2001
Pin count: 423
Bus speeds: 400MHz
Status: The original Pentium 4 socket.
Outlook: Socket 423 is on its last legs, but it will support Pentium 4 processors up to 2GHz. Intel will introduce a new Socket 478 with the 845 chipset as early as September. Any system or motherboard with Socket 423 will have a very limited upgrade path.



Socket: 478
Introduced: 2001
Pin count: 478
Bus speeds: 400MHz and higher
Status: Intel is expected to introduce its Socket 478 later this year.
Outlook: Socket 478 will pack enough connectors to take the Pentium 4 to 3GHz and far beyond. If you've been waiting for a safe time to dive into Pentium 4, this is it, as the 478 won't go away any time soon.

FAST FORWARD BY TOM R. HALFHILL

HyperTransport Ain't Just Hype

AMD is the surprise front-runner in a race to establish the next-generation internal system bus for PCs. Intel finds itself in the unusual and uncomfortable position of playing catch-up—but the race isn't over yet.

At issue is the local system bus that will eventually replace PCI. Introduced by Intel in 1992, PCI is still serviceable but is showing signs of age. In 1996, Intel introduced the AGP interface to remove the burden of high-performance graphics cards from the PCI bus. That probably extended the life of PCI by a few years. Still, as microprocessors soar toward 2GHz and beyond, PCI will soon become a bottleneck.

In engineering terms, a bottleneck is any part of a system that limits overall performance. In a computer, the bottleneck might be the microprocessor, the system bus, the main memory, or anything else in the datapath. The important thing to realize about bottlenecks is that you can't eliminate them altogether. Removing one bottleneck only creates another—the next-slowest component or bus becomes the new bottleneck. Progress happens by steadily fixing one bottleneck after another.

PCI replaced the ancient ISA/EISA bus, which traces its ancestry back to the dawn of IBM-compatible PCs in 1981. (Some motherboards still have ISA slots for backward-compatibility with old devices, but it's increasingly rare.) Therefore, it appears that internal system buses for PCs have a lifespan of about 10 years. PCI reaches that age in 2002.

AMD and API Networks have developed HyperTransport, the leading contender to replace PCI. The current specification supports an aggregate bandwidth of 6.4 gigabytes per second (GB/sec) in a 16-bit configuration and 12.8GB/sec in a 32-bit configuration. In contrast, 32-bit PCI starts at less than 133 megabytes per second (MB/sec) and scales to only 533MB/sec at 64 bits. That means HyperTransport is 24x faster out of the gate—a huge leap.

This fall, Intel will introduce its own solution: 3GIO (third-generation input/output). Little is known about 3GIO. Intel claims 3GIO will scale to higher levels of performance than HyperTransport, thus ensuring greater longevity. However, it's clear that HyperTransport has a significant head start. More than 150 companies have licensed HyperTransport, and the first HyperTransport interface chips already exist in silicon. At this point, 3GIO exists only on paper.

HyperTransport has another advantage: software compatibility with PCI. AMD says vendors won't have to rewrite their PCI device drivers. If 3GIO doesn't offer similar compatibility, Intel will probably find itself finishing last in this race.

Tom Halfhill was formerly a senior editor for Byte *magazine and an analyst for* Microprocessor Report. *He is now a technical writer/analyst in Silicon Valley.*

Xbox Watch

The best titles may never be ported to PC

Console gaming development is supposed to *hurt* the PC industry, not help it, right? Typically, yes—but not necessarily when it comes to Microsoft's Xbox. Because Xbox games can easily be ported to the PC, conventional wisdom says the Xbox gaming development will spur some marvelous PC titles. Unfortunately, it's still not clear whether the hottest Xbox launch titles will ever make it to our side of the fence...

GAME: *UNREAL CHAMPIONSHIP*

What it is: This brand-new multiplayer-only *Unreal* game looks absolutely gorgeous. It features all new maps, vehicles you can ride in, and mind-melting special effects—and it's coming *only* to Xbox. The team is even tuning the game so that it works with a gamepad instead of the traditional mouse/keyboard combo. It's like the fates hate us or something.

Could this be done on a PC: The game uses the new Epic *Unreal Warfare* engine, so we'd bet it could work on a PC. But the addition of all the new technical goodies (like volumetrically lit smoke) would need a real work-horse of a system to keep the action smooth.

PC prognosis: Bad. Very bad. Even Xbox fans won't see it until after the console is upgraded with online capability sometime in 2002.

GAME: *ODDWORLD: MUNCH'S ODDYSEE*

What it is: This bizarre-looking 3D platformer is actually an extension of the 2D *Oddworld* series. The move to full 3D is accompanied by a wealth of nice graphical touches and environmental interactions. A unique "gamespeak" feature lets you control several of your fellow "mudokans," who can perform fairly complex tasks.

Would this work on a PC?: Some of the finer details might have to be scaled back—but the real problem will probably be the fact that the game requires an analog gamepad. You can forget about controlling this game with a keyboard and mouse.

PC prognosis: Unlikely.

GAME: *HALO*

What it is: A stunningly beautiful first-person shooter, Halo takes place on a ring-shaped moon. Earth forces and aliens fight for control, using everything from conventional firearms to armored vehicles. Originally intended to be an online game, Internet play has been dumped so the game can be played in split-screen mode on a single TV. Ewww.

Would this work on a PC?: Yes. Halo was originally designed for the PC, and first-person shooters are most easily controlled with a PC keyboard.

PC prognosis: Microsoft still won't say whether the game will make it to the PC, but we hope it does cross over.

GAME: *DEAD OR ALIVE 3*

What it is: *DOA3* may be the most visually entrancing fighting game ever made. Aside from the highly lifelike motions and different martial arts styles, one of the game's best features is the ability to knock opponents out of windows and even off of cliffs, then jump down after them to continue the fight.

Would this work on a PC?: Maybe our Dream Machine could handle it. *Maybe*. And then there's the controller... Oh, just forget it.

PC prognosis: Great fighting games are few and far between, and none of them are available for the PC. If this game can match the intensity and elegance of Dreamcast's *Soul Calibur*, we'll have to buy an Xbox for the Lab.

GAME THEORY

BY THOMAS L. McDONALD

Why I'm Sticking With a Lame-Ass Game

■ **Sure as the earth rotates and the sun rises, every massively multiplayer game released must have some appallingly screwed launch. Many like to gnash their teeth and whinge about *Ultima Online*, but Origin sent that puppy off with the clockwork precision of a shuttle launch compared to *World War II Online* (dead servers, go-fix-a-sandwich load times, appalling frame rates, a 60MB day-one patch) and *Anarchy Online* (no credit card encryption, bad CD keys, a lag from hell). Of the two, *WWII* was clearly the main offender, since a blind albino river rat (much less a Cornered Rat) could have seen this was an alpha unfit for prime time. That anyone—including myself—sticks with this game is proof of the intense desire for a game of its type.**

■ **Every cliched Mexican in a horror movie who mutters "El diablo!" had better watch his ass, 'cause Blizzard is in town. Come to think of it, Old Scratch himself might want to drop a dime on Johnny Cochran. Apparently Blizzard—last heard saying "What is this 'high resolution' thing you keep talking about?"—owns his name. (The Devil's, not Johnny Cochran's, although Blizzard's working on that, too.) New Line Cinema had the gall to call its new Vin Diesel movie *El Diablo*—a movie which, by the way, had nothing at all to do with madly clicking low-res sprites—in obvious violation of Blizzard's complete ownership of said word. According to the once-respected Blizzard, the movie is "likely to cause confusion with or likely to dilute Blizzard Entertainment's *Diablo* marks." Also, "this ruling prohibits New Line from using the mark *Diablo* in any form, whether used alone or in combination with any other words," thereby crushing hopes of calling the movie *El Diablo Gets a Puppy*. Since IMDB lists 155 other movies with the word "diablo" in the title, those wacky Blizzard lawyers need to get busy.**

■ **Even more bizarre than the fact that Troma (the company behind *Toxic Adventure, Nukem High*, and other cult exploitation flicks) is making a game is the fact that they're making a turn-based strategy game. Looking a lot like *Jagged Alliance* with mutants, breasts, and exploding heads, the demo is probably the most worthwhile 230MB download on the web right now. The intro movie establishes a new gold-standard for bad taste, and Troma president Lloyd Kaufman's semi-coherent narration and "tutorial" sets some sort of record for game profanity. Not for the faint of heart, but pretty hilarious stuff. Find it at www.fsgs.net.**

Tom McDonald has been covering games for countless magazines and newspapers for 11 years. He lives in the New Jersey Pine Barrens.

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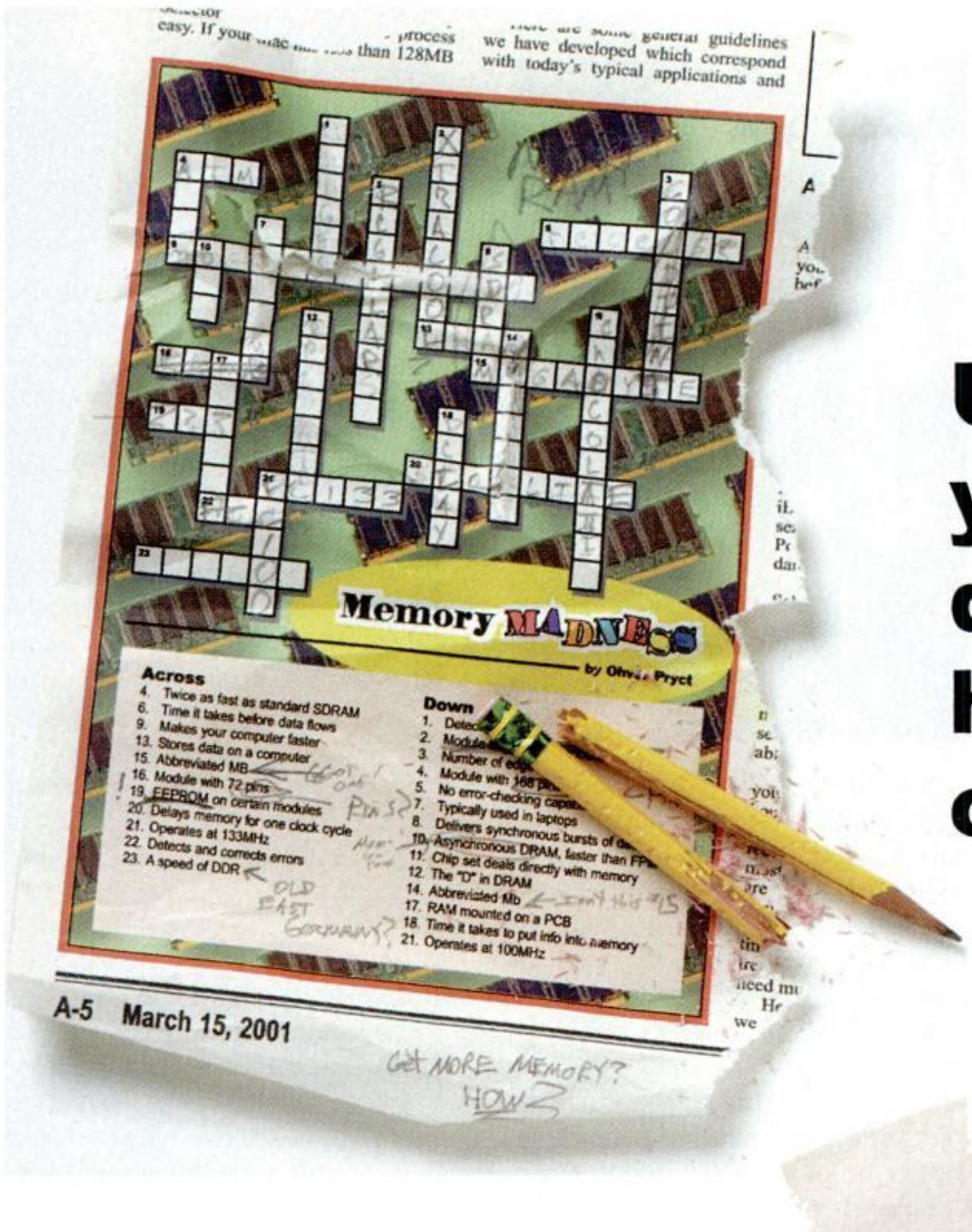
Memory MADNESS
by Oliver Pryct
Across
4. Twice as fast as standard SDRAM
6. Time it takes before data flows
9. Makes your computer faster
13. Stores data on a computer
15. Abbreviated MB
16. Module with 72 pins
19. EEPROM on certain modules
20. Delays memory for one clock cycle
21. Operates at 133MHz
22. Detects and corrects errors
23. A speed of DDR
Down
1. Detec
2. Module
3. Number of edg
4. Module with 168 pi
5. No error-checking capab
7. Typically used in laptops
8. Delivers synchronous bursts of d
10. Asynchronous DRAM, faster than FP
11. Chip set deals directly with memory
12. The "D" in DRAM
14. Abbreviated Mb
17. RAM mounted on a PCB
18. Time it takes to put info into memory
21. Operates at 100MHz
A-5 March 15, 2001
GET MORE MEMORY? HOW?
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1. Fast, easy way to find the right memory upgrade.

Upgrading your memory doesn't have to be complicated.

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MORE THAN 60,000 UPGRADES — PC Makers' CHOICE — OVER 11,000 SYSTEMS

$49.95 256MB PC2100 DDR

Price reflects an automatic 10% discount for ordering online. Price was taken on 7/10/01 from Crucial's Web site; however, prices can (and do) change daily. Prices may vary according to specific system requirements.

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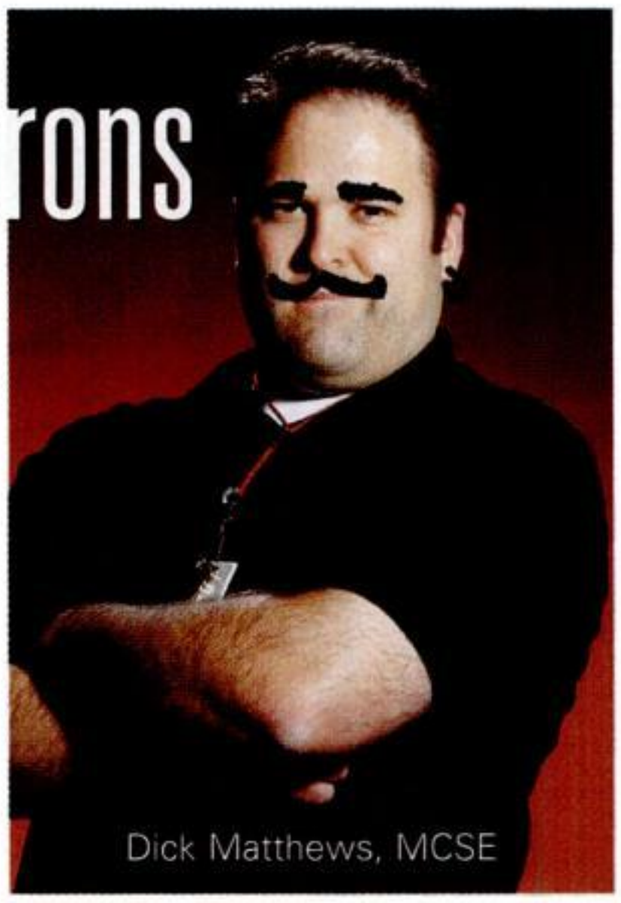
HELPFUL HINTS

Windows Tips for Morons

I fail to see the humor in Win98 bloat removal


Dick Matthews, MCSE

Now that the fancy lads up in Human Resources have let me remove that ludicrous party hat, you can kiss the "kinder, gentler Dick" goodbye. "Hardass Dick" is back...

Hey, what are you laughing at?

Anyway, now's the time to brace the jellified goo you call a brain for another whopper of a Windows tip. This month, I'm going to tell you how to strip all the useless crap out of Windows, just like we do in my IT shop. See, the only browser authorized to run on my network is...

OK—what the *hell* are you laughing at?

Anyhow, there's a utility available at **www.98lite.net** that'll save you the trouble of manually removing *Internet Explorer*, piece by stubborn piece. *IEradicator* allows you to quickly remove all versions of *IE* (from 3.0 to 5.5) from all Windows 9x OSes. To use *IEradicator*, close all your applications, run the EXE file, and reboot immediately. Ridding yourself of 30MB of useless bloat in the name of "in-tee-gration" is that simple. If, for some inexplicable reason, you once again want to run *IE*, you can download and install the latest version, and it will behave like a standalone browser, without getting its stinkin' fingers into all corners of Windows Explorer.

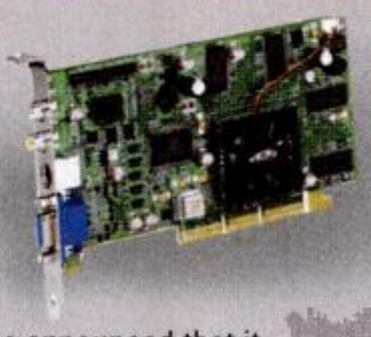
By the way, the utility called *98lite* (available at the eponymous site) will convert unnecessary Win98 flotsam—such as online service installers and Active Desktop—into components that can be safely uninstalled using the Add/Remove Programs Control Panel. In a nutshell, the utility strips all the bloat from Win98 to make it run as quickly as possible.

Still laughing, huh? That's cute. Real cute.

In a note relating to last month's column, it seems a few of you numbskulls don't know anything about Unix. Last month, I told you how to turn on command line auto-completion in Windows 2000. Unfortunately, one of *Maximum PC*'s dumbass editors removed the portion where I told you to mash the Tab key to auto-complete stuff once you changed the Registry key. Figures. *They're* utter morons, as well.

OK, that's it! Wipe that smirk off your face, or you'll be whistling "The March of the Atomic Wedgie" all the way to the parking lot.

FUN-SIZE NEWS



ATI Picks Up Pace

Responding to complaints about the (in)frequency of its driver updates, ATI has announced that it will now revise drivers every three weeks (historically, the company has kept to a six-month schedule). **To speed up the revision** process, ATI will ditch its **policy of only** releasing Microsoft-approved drivers.

Phones Got Game

You may soon be playing multiplayer **games** on your wireless phone. **Nokia, Motorola,** Ericsson, and **Siemens have formed the** Mobile Games Interoperability Forum, **which will** design a multiplayer gaming **spec and** create SDKs for game developers. **Sony,** meanwhile, has partnered with NTT-DoCoMo **to** bring better gaming to iMode-based phones. It's not known **if** Sony or **DoCoMo will join** forces **with the forum.**

DirectX Forces Combine

Kevin Bacchus, **the man who helped create the** Xbox, has left **Microsoft to join the man who** helped **create DirectX.**

Bacchus **left his job as Xbox's manager of** third-party **relations to join WildTangent as** the senior director of marketing.

Bacchus will work with **former** *Maximum PC* columnist **Alex** St. John, who is **credited as** one of three people who created the **DirectX APIs** while at **Microsoft.**

WildTangent lets developers create DirectX applications **that** can be accessed, **through a** web browser **or applications** such **as *Winamp.***

YOU HEARD IT HERE FIRST

What Upcoming Technology Is Going to Save the PC?

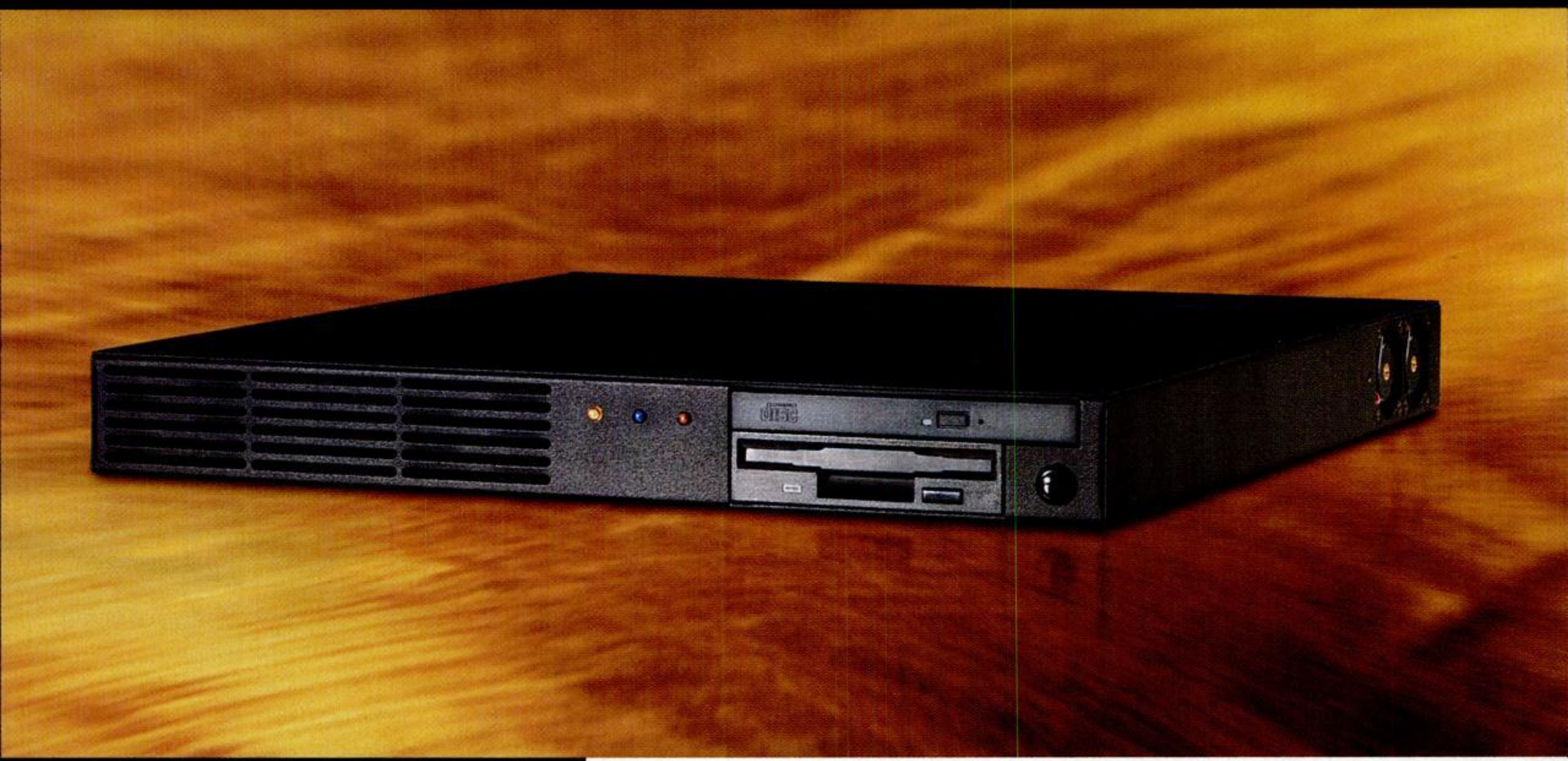
"CONNECTIVITY WILL KEEP THE PC ON THE LEADING edge of game innovation for the foreseeable future. If the 1990s was the decade of 3D, then this decade will be **all about connectivity. The** PC is the primordial soup from which all new ideas that **define gaming will emerge;** consoles may **own a lot of the market share** going forward, **but they can never evolve** and innovate **as fast as the PC." –Alex St. John,** president **of Wild Tangent and former *Maximum PC* columnist**

"THE TECHNOLOGY THAT will invigorate consumer PC sales is the new writeable DVD format, DVD+RW. This is the missing piece of the video-editing puzzle. Finally, users will have a way to distribute their work to others, to be viewed on conventional DVD players." **—Brian Zucker,** Dell technology evangelist

"I BELIEVE ADVANCING COMMUNications and connecting people to people are important steps that put the PC at the center of this new and evolving digital world. People want to stay connected to friends and family, and the PC enables a very rich, personalized communications experience. The technology industry needs to continue making this simple for users."—**Shawn Sanford,** Microsoft Group product manager for Windows XP

NOTE: *It appears that Mr. Sanford believes Internet usage will save the PC.*

SleekLine™ 1000 System



SleekLine™ 1000 Features

- Compact, Stackable, and Transportable
- Intel® Pentium® III Processor @ 1000MHz
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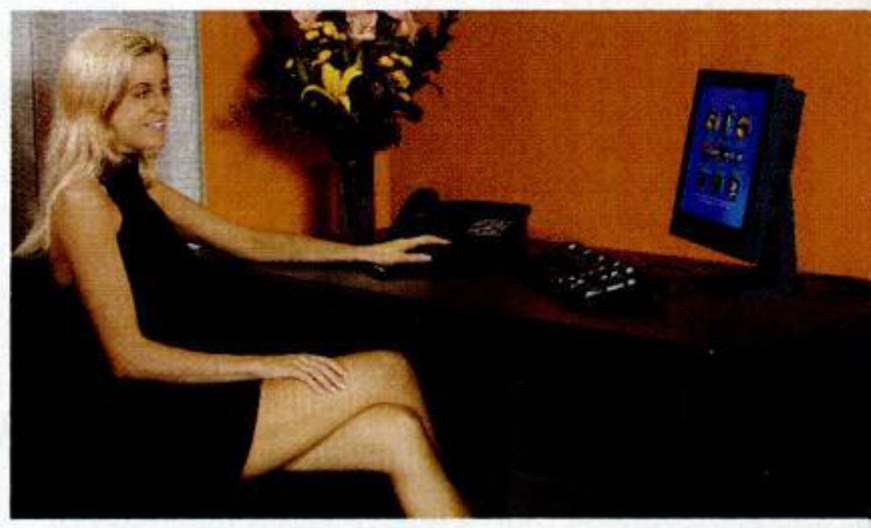
- 24X Low-Profile CD-ROM (DVD option)
- Sony 3.5" Floppy Drive
- Integrated High-Res. 3D AGP Graphics
- Integrated Enhanced Audio
- Integrated 10/100 Ethernet
- Integrated Hardware Diagnostics
- SleekLine™ All-Steel, USA-Made Case
- Silencer® 150 1U Ultra-Quiet Power Supply
- Black Keyboard and Mouse
- Windows® ME or Windows 2000 Optional
- NEC 15.1" LCD Monitor Option (pictured)
- 3-Year Warranty and Expert Support

Saves Space and Looks Great Too!

Just as the 1U rackmount revolutionized the server market, the SleekLine 1000 Mini 1U computer combines compact size, integrated features, uncompromised performance, and exceptional value, to make bulky PCs a thing of the past.

The versatile SleekLine 1000 sits unobtrusively under your monitor or, with its optional bracket, mounts inconspicuously to the bottom of your desktop (see photo). It can be used for sales presentations on the road, or unlike ordinary PCs, stacked in an array to save space.



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With its 1GHz Pentium III, built-in fast Ethernet, high-resolution graphics, and low-profile case, the energy-saving SleekLine 1000 is the perfect Internet machine, office workstation, or home entertainment computer.

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Head2Head

A showdown among natural PC competitors

THIS MONTH: Audio Breakout Boxes

No, we're not trying to pull a fast one on you. We have indeed already reviewed both the Sound Blaster Live! Platinum 5.1 and the Hercules Game Theater XP soundcards—but this match-up pits the two cards' breakout boxes against each other in a full-duplex fight. Let the connectors fly!

Even mass-market PCs now come with sophisticated audio hardware that supports Dolby Digital 5.1 sound. But to properly turn your desktop PC into an all-digital DVD theater, you've got to have connections. You'll need 1/8-inch "mini" jacks, 1/4-inch jacks (for higher fidelity), RCA connectors, an optical pass-through, and maybe a couple of MIDI and USB ports for fun and games.

The tricky question is, Do you want your breakout box internal or external? Half of us like the fact that Creative's Live! Drive IR slides into a drive bay so you always know where to find it. The other half of us like the Game Theater XP's mobile breakout box, which lets you move your audio connections up to your physical desktop. But when it comes right down to it, what really matters is whether a breakout box gives you the right connections. On that score, one of the two boxes reviewed here has a definite advantage.

—ROB PRATT

CREATIVE LIVE! DRIVE IR

Digital connectors: Most surround-sound and Dolby Digital 5.1 speakers come with two options for making a digital connection to your soundcard: S/PDIF and optical. S/PDIF is a digital audio format that uses a common RCA connector, and the Live! Drive conveniently adds a S/PDIF input to the front of your PC. Set-top DVD players and home theater receivers often have optical outputs, which send a digital audio signal down a single fiber-optic cable. As with S/PDIF audio input, the Live! Drive provides a front-panel optical input. In the Live! Drive, both the S/PDIF and optical inputs are paired with corresponding outputs for sending DVD audio to a home theater receiver or to a set of Dolby Digital 5.1 speakers. **Winner:** Tie

Extras: You got game? Sorry, but the Live! Drive IR doesn't have connectors for a gameport or USB devices. It does have connectors for MIDI input and output. Instead of standard-size MIDI connectors, the Live! Drive IR uses smaller DIN connectors that require adapter cables before they'll work with regular MIDI plugs. The main bonus feature on the Live! Drive IR is an infrared remote control, but it only works with Creative's own audio and DVD software—when it works at all. **Winner:** Game Theater XP

Installation: Think CD-ROM drive installation, and you get the picture. First you take the panel covers off of your case, then knock out the faceplate from an open drive bay. Then slide in the Live! Drive IR and fasten it with a few screws. To connect to the Sound Blaster Live! PCI card, the Live! Drive IR uses a 40-wire ribbon cable that attaches to the inside left of the Live! Drive and to the inside edge of the Live! PCI card. **Winner:** Game Theater XP

Portability: Need to pack up your PC for a LAN party? No problem with the Live! Drive. It's permanently installed in an optical drive bay, so there's no forgetting it. **Winner:** Live! Drive IR

Analog connectors: The external connector panel of the Live! PCI card boasts analog outputs and inputs, so the analog connectors on the Live! Drive only add an additional 1/4-inch headphone output, a second 1/4-inch microphone input, and a stereo pair of RCA connectors for a second auxiliary input. If you need to make extra analog connections—say, to connect an output from your home stereo or an input for an additional microphone—the Live! Drive offers handy front-panel connectors on your PC. But for basic PC audio and desktop theater setups, you'll still have to wire up the back of your PC. **Winner:** Game Theater XP

MAXIMUMPC VERDICT

Live! Drive
CREATIVE LABS

WHAT WE LIKE

Slide it into an optical drive bay, screw it into place, and it's always at the front of your PC case where you need it.

WHAT WE HATE

Since the main connectors for the Sound Blaster Live! are on the PCI soundcard, the Live! Drive IR isn't very useful, except for S/PDIF and optical digital connectors.

800.998.5227 | www.soundblaster.com
$200 (includes soundcard)

6

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HERCULES GAME THEATER XP

Extras: Since the Game Theater XP doesn't make any claims about music-production capability, we didn't expect to see MIDI ports on the breakout box. But there they are, located on the right edge of the back panel. Any standard MIDI cable can connect to the full-size MIDI input or output ports. Even better, the Game Theater XP's breakout box comes with four USB connectors and a gameport. Once you've run the USB jumper from one of your PC's USB ports to one on the breakout box, you'll have three USB connectors left over for game controllers, joysticks, or any other USB device that doesn't require a powered port. **Winner:** Game Theater XP

Portability: Picture the scene: Senior Editor Gordon Mah Ung assembles a monster gaming rig with all the fastest hardware. He drops the Game Theater XP's PCI soundcard into the case. Then he packs up the rig so he can show it off at a LAN party and hits the road, sporting a wide grin of self-satisfaction. Somewhere along Highway 101, miles from home, he remembers something very important—he forgot the breakout box! The moral of this tale? If it can happen to Gordon, who truly loves to show off the latest PC gear to all of his envious friends, then it could happen to anyone. **Winner:** Live! Drive IR

Digital connectors: I got S/PDIF. I got optical. I've got two of each on the back panel—who could ask for anything more? **Winner:** Tie

Analog connectors: The six RCA connectors for Dolby Digital 5.1 audio (located on the back panel) are a true convenience. Why? Because virtually all surround-sound and Dolby Digital 5.1 speaker systems offer analog RCA inputs (if nothing else), and RCA cables are inexpensive and easy to find at neighborhood stereo and electronics stores. What's more, the Game Theater XP's breakout box also has 1/8-inch "mini" connectors for main and surround stereo output, the de facto standard for PC speakers. The front panel has two 1/4-inch jacks—one for headphone output and one for microphone input. You also get a mini-to-1/4-inch adapter. Finally, the front of the box boasts a pair of RCA connectors that can take line-level input from a CD player or home stereo. **Winner:** Game Theater XP

Installation: Once you've jacked in the Game Theater XP's PCI soundcard, installing the breakout box is literally plug-and-play. The breakout connects to the soundcard by way of a 6-foot-long, 44-pin cable. One end screw-locks to the PCI soundcard, and the other end screw-locks to the breakout box. The cable also comes with an attached USB jumper cable. To use the USB hub built into the Game Theater XP's breakout box, simply connect one end of the USB jumper to a port on the back of your PC and the other end to one of the USB ports on the box. With six feet of cable, the breakout box can sit on top of your PC case or move up to your desktop. **Winner:** Game Theater XP

MAXIMUMPC VERDICT

Game Theater XP
HERCULES

+ WHAT WE LIKE

The Game Theater XP gives new meaning to the term "plug-and-play." You can plug almost any audio gear you have into this PC audio breakout box, and with a built-in unpowered USB hub, it's ready for PC gaming.

– WHAT WE HATE

Forget to hook up the breakout box and you're not going to get any sound out of your PC—well, except for that POST beep from your case speaker.

877.484.5536 | www.hercules.com
$150 (includes soundcard)

8

THE UPSHOT

Creative invented the PC audio breakout box with the first-generation Live! Drive, but Hercules perfected it with the Game Theater XP. As refinements to PC audio transform desktop systems into digital entertainment centers, users demand more compatibility with home stereo and home theater equipment, and the Game Theater XP's breakout box delivers that. Because it's not installed inside your PC, it boasts extra panel real estate—and this space is used to great effect. You get a full arsenal of connector interfaces, both analog and digital.

The Game Theater XP isn't the end of the story, however. Other PC hardware vendors have already caught on to the idea that PC multimedia is moving out of the box. Expect to see even bigger breakout boxes in coming months from major PC audio players such as Yamaha and, no doubt, Creative.

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WatchDog

Maximum PC takes a bite out of bad gear

Got a bone to pick with a vendor? Been spiked by a fly-by-night operation? Sic The Dog on them by writing **watchdog@maximumpc.com**. The Dog promises to get to as many letters as possible, but only has four paws to work with.

Johnnies-Come-Lately Need Not Apply

Perhaps you're wondering whether you can still get on board the class-action settlement against Philips—this would be the suit concerning the consumer-unfriendly CDD2600 CD-R drive. Well, The Dog has some bad news: It's too late. If you didn't join the class last year, you're out of luck.

Keyless Entry

Dilemma: You've lost your Windows product key, but you don't want to search for the numbers by mucking around in your Registry (which is exactly what The Dog suggested you do last month). Is there an easier way? Yes. According to reader William Wright, all you need is your restore CD. If you call Microsoft at 800.936.5700, the company will either decode the product key or issue you a new one—assuming your CD boasts an authentic number sequence that identifies the disc as a legitimate Microsoft product. Even better, Wright says, Microsoft offers this as a free service. The Dog took a restore CD from HP, read numbers off of the CD to a support techie, and received a new product key from Microsoft. Woof.

It's Dead, Jim!

DEAR DOG: I'm finding it difficult to get supplies for the Alps MD-5000 printer that I purchased about a year ago. Sure, I've always had to order them from outside of my province (I live in Canada), but they were still relatively easy to get ahold of. But when I last visited Alps' web site, the printer wasn't listed. I'm starting to worry that Alps is going under. Any information you can provide would be much appreciated.

—Jon Green

THE DOG RESPONDS: Bad news, Jon. Alps actually pulled the plug on its MD printer line more than a year ago. There is some good news, however: Alps says it is committed to producing supplies for its printers for a "number" of years. This sounds only somewhat reassuring, so Alps printer owners may do well to stock up on ink. To purchase supplies directly from Alps, visit www.buyalps.com.

> ***"Alps says it is committed to producing supplies for its printers for a 'number' of years."***

Lost Orb Down Under

DEAR DOG: I purchased a 2.2GB external Orb drive from Castlewood in October 2000. When the drive failed, I promptly returned it to Castlewood for repairs. After hearing nothing from the company for several months, I called the company to find out the status of my drive. A technician told me a replacement drive had already been mailed to me. Of course, I never received it. The person promised to run a tracer and contact me. You guessed it: No one ever contacted me. Even worse, my e-mails to the person who issued me the original RMA went unanswered. To date, I have heard nothing from Castlewood. I paid in excess of $400 (Australian) for this drive, and I cannot afford to lose this item forever.

—Don Kirk

THE DOG RESPONDS: The Dog contacted Castlewood for its side of the story. A Castlewood official apologized for the goof-up. Apparently, one of the employees that Don corresponded with was out on maternity leave and the other left the company. The company did indeed send a replacement drive to Don, but with the two employees gone, his complaint of non-receipt fell through the cracks, and follow-up measures were never taken. In the end, Castlewood offered to send another replacement drive to Don and also provided him with new contact information in case he had further trouble.

Burn It In

DEAR DOG: This is in response to Sam Cope's letter (May 01) concerning his OEM CPU going bad. While I understand your stance against buying OEM CPUs, I think you omitted one key point—the burn-in. Burning-in a system will usually allow you to find problems within the short warranty window commonly offered with OEM parts. There are, as you know, quite a few utilities that allow you to do a burn-in. Personally, I like *SiSoft Sandra* [a diagnostic/benchmarking utility suite that comes with a special burn-in feature, available at **www.3bsoftware.com**].

I agree with you that if you buy OEM, you have to accept risks. But if you're willing to go OEM, remember that a burn-in can at least give you a better chance of not wasting your hard-earned money.

—Warren P. Abbott

THE DOG RESPONDS: For readers who aren't hip to what Warren's talking about, "burning-in" involves taxing a new system with a continuous stream of heavy-duty activity in an effort to expose the rig's potential failure points. At *Maximum PC*, we like to run continuously looping game demos to put pressure on a system's CPU, motherboard, memory, and videocard.

The Dog agrees that burn-in periods are important. When you purchase a new part, you should immediately make sure it works. And whenever you buy anything having to do with PCs, you should make sure your product packaging includes everything it's supposed to include.

Prime Rebate Sucker

DEAR DOG: Do you remember the $45 OfficeMax rebate on Prime Peripheral's 200 CD-R bulk pack, which was offered nationally in February? After waiting several months, I finally got a postcard that said: "Unfortunately we could not honor your request due to the following reason(s): Your e-mail address was not included with your rebate submission."

After re-reading the rebate coupon, I confirmed that providing an e-mail address was *not* a requirement to qualify for the rebate. The qualifying statement reads: "Requests from P.O. Boxes are not accepted and requests with invalid or undeliverable mailing addresses will be rejected." I did leave the e-mail address blank, and I also left the fax number blank (I don't have one). What happens if you don't have an e-mail address or a fax number?

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The company said that I had to resubmit with "validating information." Damn if I'm going to wait another four months for them to respond!

I went to the OfficeMax store where I purchased the discs and spoke with the store manager, who said they have received numerous complaints from customers who have not received their rebates. He also said that Prime Peripherals is refusing to honor this rebate, and that OfficeMax is aware of the problem. The store manager did say that it would be great to have everyone return the unused discs to Prime Peripherals and overwhelm the company with a mountain of returned discs (if you have your receipt, you can get a refund).

—Jim Murphy

THE DOG RESPONDS: The Dog contacted Prime Peripherals about its rebate policy. A spokeswoman says the problems stem from an incredible demand for the CD-R bulk packs. Apparently, the rebate offer generated three times the volume that Prime Peripherals and OfficeMax expected.

"The rebate company we hired to process this rebate could not handle the additional mail so we needed to move all the responses—which had already started to be processed—to a new fulfillment facility in Texas. This created a small delay in getting rebates processed and mailed out to consumers," according to the spokeswoman.

As of mid-June, about 71,000 checks were issued in the order the rebate forms were received. "People who received a postcard stating that their rebate was initially denied need to provide the information that was missing and mail back the postcard. As soon as the postcards are received, the fulfillment house will complete the processing and checks will then be cut," says the spokeswoman.

Prime Peripherals says it will honor certain rebates despite the fact that OfficeMax didn't have authorization to extend the rebate offer or to offer it outside the continental U.S. So, if OfficeMax extended the postmark on your rebate request, issued a rain check on your request, or validated a rebate from stores outside the continental U.S., you've slipped under Prime Peripherals' wire.

But all of this might just be in theory. Reader Mason Oshiron says he's had no such luck with Prime Peripherals. Oshiron purchased a modem and CD-ROM drive from the company and filled out a rebate form more than a year ago. When his $55 never arrived, he contacted the rebate center and was directed to Prime Peripherals.

"I tried calling the number (for Prime Peripherals) and after 20 minutes of busy signals, I got through and was greeted by an answering machine," Oshiron says. "I tried the rebate-information option, but it was unavailable, so I tried the operator, who was also unavailable. After I tried different extensions, the answering machine just hung up on me."

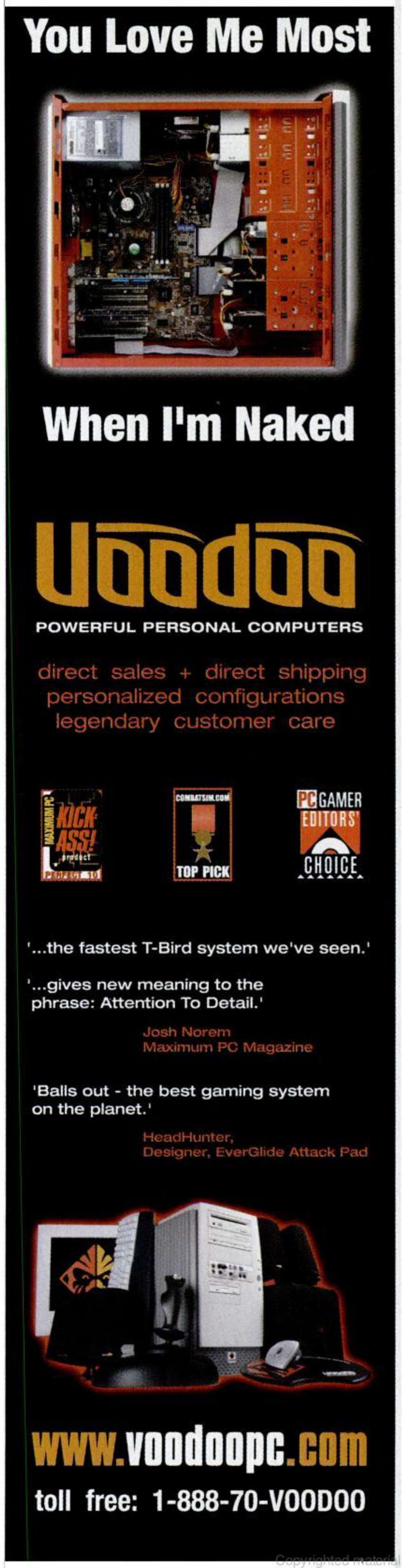
Other readers have filed complaints against the company for not sending rebate checks. Of course, this isn't a new situation. The PC industry is rife with rebate offers that are often worthless (witness the meltdown of CyberRebate.com). The Dog warns any potential customers of Prime Peripherals to be wary. Your rebate check may take an unreasonable amount of time to arrive or may never arrive at all. Woof.

FTC Alert

If you're one of the 60,000 people who paid for "free" Internet access from RhinoPointw.com, the FTC is working to get your money back.

The Federal Trade Commission has sued New Millennium Concepts, Inc. (the company behind RhinoPoint.com) as well as owner Karl Kay for allegedly scamming customers. The FTC suit alleges that in November 1999, New Millennium Concepts began asking people to sign up with the ISP, offering $22 monthly reimbursements to customers who participated in monthly surveys. Customers also had to pay startup fees between $9.95 and $15.95, fill out an extensive member profile, and provide a credit card number.

The FTC suit alleges that few of the 59,200 consumers actually received a survey from New Millennium Concepts, and no one—not even survey takers—was ever reimbursed for the Internet access. Less than a year after launching, RhinoPoint.com went offline, the FTC says, but only after collecting some $500,000 in fees. The FTC sued New Millennium and Kay for violating the FTC act prohibiting unfair or deceptive acts or practices affecting commerce. The FTC has asked the court to put a freeze on the company's business, as well as ban the reselling of the personal and financial information collected from consumers. ■



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DREAM

GAMING RIG
PAGE 26

ENTERTAINMENT CENTER
PAGE 30

CONTENT CREATION MACHINE
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BENCHMARKS
PAGE 38

"Now, if you turn your

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MACHINES 2001

attention to the gestation pods, you'll find the culmination of a year's worth of research and development—not just one, but *three* ultimate PCs, each equipped with its own unique set of armaments. Working together in coordinated attack sequences, the Dream Machine triumvirate can destroy all benchmarks in the known universe and master any PC entertainment task known to humankind."

Dear fellow geeks and gearheads: We live in an increasingly antagonistic PC universe. Content creation programs demand greater CPU and memory resources. Games demand more highly engineered videocards. And a growing number of entertainment applications demand the installation of components that many of you can't even imagine.

This rapid escalation of binary aggression, in turn, demands a complete re-evaluation of the "personal computer" concept. *Maximum PC* cannot—*must not*—stand idly by. This is exactly what we concluded during the winter of 2000, when we began assessing our hardware defenses, and determined that a single box could not fulfill all wartime duties. And thus began the Dream Machines 2001 Project. Its mission? To research and develop a trio of highly-specialized computing machines that could lead *Maximum PC* into new, hostile theaters of operation.

Monetary and temporal expenses were of no concern. We commissioned the very best parts for each of the three Dream Machines and fine-tuned each rig for maximum efficiency. At point stands our gaming rig. Next up is our PC entertainment center. And covering the back door is our content creation box.

Get out of the way, because a new world order is coming through.

by MPC R&D

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THE GAMING RIG

It doesn't take a rocket scientist to figure out that our dream gaming rig is no ordinary PC foot soldier. Its aluminum case screams special forces, its hyped-up GeForce3 exudes an almost visible bloodlust for laggardly frame rates, and its supercharged Pentium 4 practically vibrates to the beat of a 2GHz frequency. Wuzzat, you ask? 2GHz? Yes. Is the gaming rig equipped with a secret CPU, something lifted *Mission Impossible*-style from the vaults at Intel? We won't say here. But we will say that we like raw processing power, and we like hoarding chunks of classified silicon. Even more so, we like firing up game upon game, looking for something, anything, that can bog down the gaming rig, henceforth know as "The Specialist."

Besides offering unparalleled performance, The Specialist shows just how profoundly the gaming rig category has changed during the last four years. Circa 1997, if you wanted to configure a kick-ass gaming rig, you were talking three videocards (two Voodoo2s in SLI mode, plus a 2D card) and two soundcards (one ISA and one PCI). That kind of price, qualification, and customer-service commitment was enough to scare off all the big OEMs, so if you wanted such a rig, you had to build it yourself. But times have changed. The Compaq PC that your granny just bought might very well contain the same videocard, soundcard, and CPU that you have.

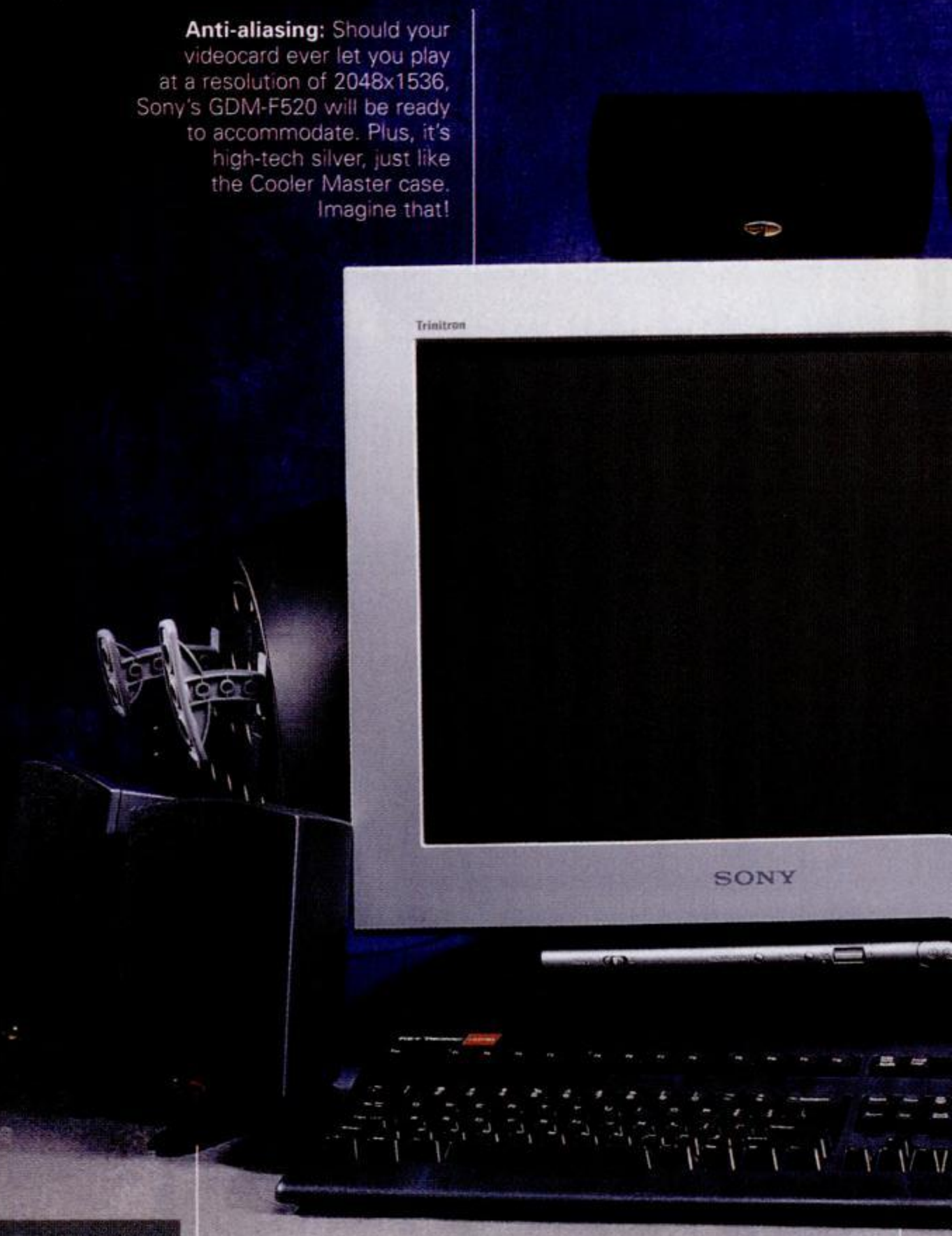
But that doesn't mean that in today's world, one can't fine-tune the hell out of even the most standard configurations. Besides "acquiring" a rarefied 1.8GHz Pentium 4 and ratcheting it up to 2GHz, we overclocked our GeForce3 card and spent almost as much time finessing the machine's internal wiring as we did arguing about what parts to use. Our braided IDE cables provide no better performance than generic ATA/100 cables, but they elicit oohs and ahhs whenever we show off the machine, and this is well worth their hefty price tag.

The Specialist is the fastest gaming machine we've ever tested, let alone built. We can think of no better box to lead our Dream Machine trio into battle.

"Wait a minute, something's wrong."

CPU clock frequency's too high. Videocard temperature's off the charts. Captain... this machine's been overclocked!"

Anti-aliasing: Should your videocard ever let you play at a resolution of 2048x1536, Sony's GDM-F520 will be ready to accommodate. Plus, it's high-tech silver, just like the Cooler Master case. Imagine that!



CODENAME: THE SPECIALIST

CLASS: Commando

EXPERTISE

Be it *Quake III Arena*, *Tribes 2*, or *Giants*, no game title available now or in the next six months is beyond this rig's killing efficiency. It can terminate frame rate barriers with stealth and extreme prejudice.

PRIMARY ARMAMENTS

Full-metal-jacketed aluminum case, classified 1.8GHz Pentium 4 OCed to 2GHz, OCed GeForce3, Klipsch 5.1 speakers, IDE RAID.

Audio POD: The Klipsch 5.1 speaker system offers not only 500 watts of peak power, but also a nifty control pod with an input and headphone jack.

Saliva guard: Keytronic's Designer series even has a rubber-coating option. Why would one need a rubber coating, you ask? Ah, yes, the mind weaves a number of elaborate scenarios, none of which are fit for print. Suffice it to say, Orangina residue does not age well over time.

Use the Force, Luke: Microsoft's Sidewinder 2 Force Feedback joystick gives us some great reasons to give in to the dark side. For starters, the power supply integrated into the base of the joystick serves a dual purpose: It gets rid of an annoying power brick and provides enough heft to keep the base steady on your desktop during a hectic jump to light speed. As for the stick itself, smooth action on all axes of motion and a smart button layout mean we don't have any trouble lining up shots or getting them off at just the right time.

Mount it in front: Cooler Master's ATC-201 gives you two filtered intake vents and front-mounted USB ports for quick-and-easy controller connections. Plus, gaming boxes must look swank for LAN parties, and nothing says "swank" better than a brushed aluminum bezel.

It's illogical: The Logitech Wingman Formula Force is the best force-feedback wheel—the best, Jerry, the best! With a force-feedback transmission that uses a steel cable, the Formula Force eschews wussy gear-based echanisms, and the result is a much more realistic-feeling force-feedback effect. The bad news is that this wheel is no longer in production, so if you happen to see one for sale, grab it as fast as you can. Just don't make the istake of buying the similarly named Wingman Formula Force GP, which is a wholly unsatisfactory alternative.

Ain't no crash pad: Choosing a gamepad is a highly personal endeavor. Everyone has different tastes, but at *Maximum PC*, most editors opt for Microsoft's Gamepad Pro—precisely because most sports sims include automatic support for the controller.

On a short leash: Hercules' Game Theatre XP gives you a beautiful breakout box with optical and analog connectors as well as spare USB ports. Read more about it on page 21.

THE LOAD OUT

Before any commando is dropped into a hot-landing zone, equipment is checked and double-checked. To ensure that an operation doesn't turn into a complete charlie foxtrot, we outfitted The Specialist with the deadliest weapons available:

- **CASE:** Even when standing in a crowd of aluminum copycats, the **Cooler Master ATC-201** announces a fearsome presence. It features plenty of room for hard drives, a front bezel that accommodates four optical drives, and no fewer than four fans to help get air moving through the case. Our particular ATC-201 came with a metallic paint job so smooth, we considered breaking out the Turtle Wax to keep it shiny.
- **SPEAKERS:** How fresh and new are The Specialist's **Klipsch 5.1** speakers? Well, they pretty much went straight from Klipsch R&D to the Maximum PC Lab. That's right, folks—when we snagged the speakers, they weren't yet available for public consumption. Besides being as loud and bombastic as the Klipsch 4.1s (which are arguably the best gaming speakers ever), the 5.1s play 3D positional surround sound in games *and* 5.1 surround sound for DVD movies—and that's why you'll also find these speakers included with our dream entertainment center. The 5.1s include analog inputs, and can easily connect to popular gaming soundcards like the Sound Blaster Live! 5.1 or Philips Acoustic Edge. But we teamed them up with The Specialist because their sound quality is among the best ever. The bass, in particular, is awesome and will induce post-traumatic stress disorder if you're not careful.
- **MONITOR:** When playing games, nothing beats a big, bright, aperture-grille monitor—and when it comes to big, bright, aperture-grille monitors, nothing beats the 21-inch **Sony F520**. Its perfectly flat screen and sheer brilliance make all games infinitely more exciting. We give it a Perfect 10 verdict on page 64.
- **KEYBOARD:** The **Keytronic Designer** is a glutton for abuse. It doesn't matter if you pound your fist into it after a bad round of gaming or drop original recipe KFC crumbs into its nooks and crannies. It takes all the mistreatment and keeps on ticking.
- **MOUSE:** After a Quentin Tarantino-style, raised-gun stand-off on what mouse to include, we settled on the **Logitech iFeel**. This little critter includes a high-precision optical sensor that never needs cleaning, as well as a force-feedback mechanism that adds a new sensory element to familiar games. Some people like the force feedback. Others don't. With the iFeel, you always have the option to turn it on and off.

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UNDER THE ARMOR

A Dream Machine-caliber gaming rig must necessarily be stocked with the best CPU and videocard that any modern military budget can afford. No, we didn't spend $347,000 on two pieces of hardware, but we didn't skimp on internal components either...

THE LIST

Here's an inventory of every single part that comes with The Specialist.

Cooler Master ATC-201 www.coolermaster.com	**$250**
PC Power and Cooling Silencer 400 www.pcpowerandcooling.com	**$180**
Braided IDE cables www.plycon.com	**$100**
ASUS P4T www.asus.com	**$170**
Intel 1.8GHz Pentium 4 www.intel.com	**$562**
256MB Kingston PC800 RDRAM www.kingston.com	**$180**
LeadTek GeForce3 TD www.leadtek.com	**$350**
Hercules Game Theater XP www.hercules.com	**$150**
Two IBM 60GB 60GXPs www.ibm.com	**$400**
Promise FastTrak 100 TX2 www.promise.com	**$95**
TDK veloCD 24/10/40 www.tdk.com	**$280**
Pioneer DVD-115 www.pioneerelectronics.com	**$100**
3COM 3C905B NIC www.3com.com	**$40**
Klipsch 5.1 www.klipsch.com	**$400**
Sennheiser HD580 www.sennheiser.com	**$260**
Sony GDM-F520 www.sony.com	**$1,700**
Keytronics Designer www.keytronics.com	**$25**
Logitech iFeel Mouse www.logitech.com	**$40**
Logitech WingMan Formula Force www.logitech.com	**$120**
Microsoft Gamepad Pro www.microsoft.com/hardware	**$35**
Microsoft Force Feedback 2 www.microsoft.com/hardware	**$110**
Microsoft Windows ME www.microsoft.com	**$165**
Total *Maximum PC* price:	**$5,712**
Total price if machine were built by the U.S. government:	**$101,359**

■ **Motherboard:** Asus says its **P4T** is the best selling Pentium 4 motherboard in the world. We won't argue with that claim. With the rest of the pack ranging from dull to boring, the P4T's advanced BIOS settings make the board the best home for any lonely Pentium 4. Even better, the P4T features both software-based *and* hardware-based overclocking options. An important note: We do have serious concerns that Intel's move to a new socket later this year will effectively limit the life of the P4T. But *Maximum PC* Dream Machines are all about "living in the moment," and the P4T got us to 2GHz without breaking a sweat.

■ **CPU:** Let's get it out in the open: If you want a CPU that's perfectly balanced for gaming and all-around application work, we recommend AMD's Thunderbird Athlon. But for those who are hell-bent on gaming performance, **Intel's Pentium 4** at 1.8GHz is the answer. From *Quake III Arena* to *3DMark2000* to *3DMark2001*, Intel's P4 is a benchmark destroyer. For The Specialist, we wanted extra processing oomph without having to resort to exotic (and potentially leaky) liquid-cooled systems, so we took a 1.8GHz CPU and nudged the mobo's bus a few ticks to 112MHz. The result was an effective CPU clock speed of 2016MHz (or 2.02GHz). Still think we should have gone Athlon? You're entitled to your opinion—but sometimes, clock frequency *is* king, and we have the benchmark numbers to prove it.

■ **Memory:** Direct RDRAM has gone from being a total dud on the Pentium III platform to an awesome stud on the Pentium 4 platform. We used two 128MB of **Kingston PC800 RDRAM** to feed the dual-channel configuration in our gaming rig. With Windows Millennium as our OS and gaming as our only workload, any more RAM would be a waste of money.

■ **Videocard:** It wasn't a question of whether or not to use a GeForce3 card, it was really a question of which one. Far from the weakest link is **Leadtek's Winfast GeForce3 TD**. It's basically a straight reference design, except for one feature: Its 4ns DDR SDRAM is saddled with the heftiest heatsinks to be found on any GeForce3, and the resulting heat dissipation allowed us to reliably overclock the card beyond spec. After a bunch of tweaking, we got the card to run reliably with a 220MHz core and a 257MHz DDR memory clock (that's a boost from 200MHz and 230MHz, respectively). Performance aside, the Leadtek board is fully featured, with both DVI and S-video output.

■ **Soundcard:** It was a close call, but the **Hercules Game Theater XP** won our hearts (and crushed Creative Labs'). Its breakout box gives us a free USB hub for our controllers and even supports a front-mounted gameport for our legacy gaming devices. Combined with the thumping Klipsch 5.1 speakers, the Game Theater offers kick-ass 3D gaming audio.

■ **Hard drives:** In the 7200rpm IDE hard-drive arena, IBM's Deskstar series stands as the gladiator to beat. Our pair of **60GB Deskstars** are actually slightly faster than IBM's award-winning 75 giggers. Why, you ask? Because the ATA/100 60GXP series features greater areal density for better overall performance. But even the 60GXPs' performance wasn't "good enough," so we striped 'em together in a RAID 0 configuration for even *faster* throughput in and out.

■ **RAID controller:** Promise's IDE RAID controllers offer uneventful installation (always a plus with RAID controllers) and, as far as we can tell, their drivers have never met a hard drive or motherboard they didn't like. To power our pair of Deskstars, we grabbed the **Promise FastTrack 100 TX2**. The TX2 has built-in support for 66MHz PCI motherboards, but our P4T (as well as most of the boards we've seen) don't yet support the higher speeds.

■ **Optical drives:** The optical-drive decision was a world-class bitch. Do we use a single, fast—albeit flaky—CD-ROM such as Kenwood's 72x TrueX, or a combo DVD-ROM/CD-RW? We also considered using a Double Density CD-RW, as well as Pioneer's DVD-R drive. We finally landed on Plextor's 16/10/40 CD-RW drive—but then changed our minds *again* when TDK's new 24x CD-R hit the Lab. The **TDK veloCD** will cut a 647MB CD in just four minutes, which comes in mighty handy when making game backups. To let us dupe our discs without having to first copy data to the hard drives, we added the tried-and-true **Pioneer DVD-115** 16x DVD-ROM drive. Even the Pioneer's read speed isn't fast enough to feed the TDK in

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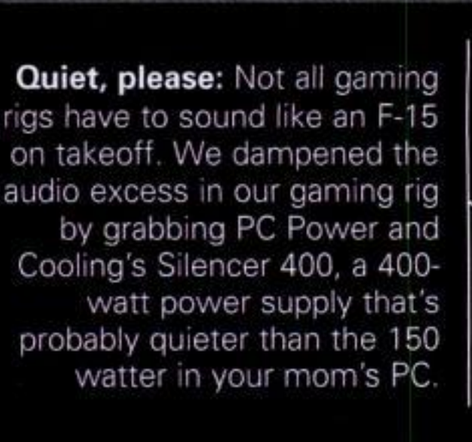
Fancy-schmancy: Cooler Master's ATC-201 aluminum construction is theoretically superior to plastic and pot metal when it comes to wicking away nasty, overclocking-unfriendly heat.

Quiet, please: Not all gaming rigs have to sound like an F-15 on takeoff. We dampened the audio excess in our gaming rig by grabbing PC Power and Cooling's Silencer 400, a 400-watt power supply that's probably quieter than the 150 watter in your mom's PC.

Overclocking champion: Asus' kick-ass P4T is the best Pentium 4 motherboard we've tested to date. It's an unabashed overclocking slut, and its expert-level BIOS settings let us easily push a suspiciously marked 1.8GHz P4 to 2GHz.



CPU 2.0: Wonder how 2GHz performs? We used to—but now we have empirical proof. We added a little nitro to Intel's spanking-new 1.8GHz Pentium 4, pushing it up to the magical 2.0 mark. And we didn't need exotic liquid cooling, either.

Stock sink: Even with the CPU pushed up to 2GHz, we didn't need any more cooling than the stock copper-bottomed Intel heatsink and fan.

Tube city: We spent $5 to buy a coil of this black wire loom to wrap our wires. It ain't no Voodoo PC, but we like the industrial look of it all.

Speed Racer: You may not need RAID for gaming, but it sure shortens the time it takes to load levels. A pair of 60GXPs gives us room for 120GB of games and cheats.

Don't be jealous of our weave!: We like the look of braided hoses in engine compartments so much, we decided to order some funky hosiery from **www.plycon.com**. These cables aren't cheap, but they can instantly clean up a machine's rat's nest of cabling.

a disc-to-disc copy, but with the veloCD's Burn Proof technology, we're not worried about coasters.

■ **OS:** Sure, we could have loaded a stripped-down Windows 98SE configuration, then used utilities to rip out *Internet Explorer* and other extraneous tidbits, but we decided to go with **Windows Millennium** because of its fast boot time and native driver support, which is more complete than Win98's. We thought about Linux but decided we wanted to *play* games, not just read about them using a crappy Netscape browser.

ESSENTIAL GAMING AMMUNITION

Must-have utilities for gaming fanatics

You supply the games, we'll supply the list of utilities you'll need to get the most out of your overall gaming experience.

Nero Burning ROM 5.5: This CD-mastering utility has rightly earned a rabid following for its stable performance, dependable upgrade cycles, mellow interface, and ability to burn just about every CD format ever conceived. **$70, www.ahead.de**

Clone CD3: When it's time to back up stubborn games, the only app to use is *CloneCD*. We've not seen a CD that it couldn't copy, given enough time. (Please note that *Clone CD* only copies CDs. To create CDs from scratch, you'll need *Nero*.) **$30, www.elby.de**

3DMark2001: You won't know if your system tweaks even work unless you have a solid way to test them. Mad Onion's *3DMark2001* 3D graphics benchmark gives you a reliable way to measure your tweaks and report them to the entire world. **$40, www.madonion.com**

Maximum PC Quake III benchmark: We couldn't find a *Quake III* demo that stressed a system enough to suit us, so we made our own. Our Padshop map-based demo—complete with enough textures to fill a 64MB card—will bring even a mighty GeForce3 to its knees. Free on the Maximum CD.

GeForce Tweaker: Includes options to tune every single feature of your GeForce. Free at **guru3d.com /geforcetweakutility**.

THE ENTERTAINMENT CENTER

"A night of R&R will do us all some good. But bring your armaments, gentlemen. You never know when we'll need a little emergency firepower."

You might be tempted to dismiss our dream entertainment center as nothing more than a digital USO show locked in a strange little box. It records TV, it shows movies, it plays music—but so do many children's toys. So what qualifies the PC entertainment center to be a member of the Dream Machine elite?

It's all about execution, friend. "The Great Entertainer" may not be charged with mission-critical responsibilities like video editing and 3D gaming, but it completes its assigned tasks with military precision. For example, when we say the entertainment center "records TV," it doesn't just record TV—it intercepts television transmissions, lets you pause and review sections of broadcasts in realtime, and saves up to 220GB of digitized TV footage across three hard drives. If you've captured every episode of "Victory at Sea" and want to archive it, no problem. The entertainment center is loaded with a DVD burner that can record all the shows to disc. The rig even comes with software that can help you create a professional-quality DVD navigation menu for all the episodes.

This merely describes the entertainment center's TV-recording functions. The rig can also crunch through 3D games, and display DVD movies in a 300-inch diagonal viewing window while blasting DTS audio across a 360-degree soundscape. And when it's time to listen to music, the machine is a master of all things MP3.

Not convinced yet? We weren't immediately sold on the concept, either. When we originally floated its design specs to our "defense contractors" in the Lab, we didn't think the entertainment center would be terribly exciting. But once we saw the weapon that had been built, we fell silent. The Great Entertainer lacks only one key feature that one would expect to find in an ultimate PC entertainment box: HDTV. We considered installing a Hauppauge HDTV tuner card, but the folks at Hauppauge said their card would conflict with our nVidia Personal Cinema reference card, and we were intent on including the nVidia card because it's the best TV-time-shifting solution for the PC we've ever tested. Of course, HDTV broadcasts are virtually non-existent in the U.S., but that wasn't the deal-breaker.

If you want a glimpse at the future of PCs, take a long look at The Great Entertainer. It's a TiVo killer. It's an Xbox killer. It's a home stereo killer.

It's a stealth weapon with deadly implications.

Rack mount *this*: Case Depot's rack-mountable R160B offers more expansion opportunities than many desktop cases. This little freak of nature was actually able to accommodate our three hard drives and large assortment of add-in cards. Built for industrial use, the R160B even has shock absorbers fitted to the drive bays!

CODENAME: THE GREAT ENTERTAINER

CLASS: Special Services

EXPERTISE

Able to intercept more than a week of television-band broadcasts for later analysis. Its optical subsystem allows captured TV signals to be distributed on discs formatted to the DVD-R and DVD-RW spec (see mil-spec NX-74205).

PRIMARY ARMAMENTS

Storage subsystems consist of three 80GB hard drives configured for silent running, a Pioneer DVD-RW drive, an unclassified nVidia Personal Cinema video device, and unclassified Klipsch 5.1 speakers. Top-secret Intel "Tualatin" Pentium III tuned to 1.2GHz.

Commercials begone: The nVidia remote can help you suck a week's worth of "The Simpsons" into your hard drive, then rapidly skip past commercials when you're actually watching the episodes. During live broadcasts, you can use the remote to pause the action—just as if you were watching a VHS or DVD movie!

Mastering your TV domain: nVidia's Personal Cinema breakout box provides all the connections you need to turn your PC into TV recording/TV time-shifting device. Confused? Think TiVo. The Personal Cinema trumps ATI's and Matrox's TV time-shifting schemes by integrating awesome scheduling software with a marvelous remote control.e you feel like a god!

Size *does* matter: With the NEC projector, you'll need a flat, white surface to project your DVD, TV, and gaming content onto, but this small inconvenience is well worth the trouble, considering your viewing area will be as large as some billboards. Playing *Black and White* at this size will *really* make you feel like a god!

They crank to 11: We nearly deafened ourselves when we tested the Klipsch 5.1s' volume capabilities without earplugs inserted. Loud volume, concert-hall highs, dance-club lows. You do the math.

Remote-control surfing: A dream entertainment center requires a cordless keyboard with integrated mouse control—because when you're controlling your PC while kicking back in the Lay-Z-Boy, you'll want full freedom of movement and as few peripherals to balance in your lap as possible. The Micro Innovations Micro Stealth keyboard fit our bill nicely: Its infrared capabilities are good for about 20 feet of service, and its integrated "joystick" mouse control is a kick to use. A set of keys can be programmed to launch individual programs.

THE LOAD OUT

Equipping The Great Entertainer with peripherals proved to be a tough chore—after all, this PC isn't typical power-user fare. We sometimes found ourselves in uncharted territory, but in the end we found a blend of components that gave us not only power, but also stealth.

- **CASE:** Because this machine is intended for living-room deployment, we wanted a case with a small, unobtrusive footprint. We briefly flirted with the idea of using a 1U or 2U rack-mount case, but these smallish formfactors are far too confining for our needs. We eventually landed on **Case Depot's R160B**, a 4U rack-mount case. The R160B's black body, sturdy metal handles, and lockable drive door give our entertainment machine the retro-minimalist look that defines techno-chic. It's downright industrial looking because, well, it's designed for industrial use. We disabled the single front-mounted fan because our CPU doesn't need the cooling assist, and we prefer to run the machine as quietly as possible. The R160B gave us enough room to mount three hard drives in addition to our coveted DVD-R drive.

- **SPEAKERS:** The new **Klipsch 5.1s** take the same bold, in-your-face approach to surround-sound audio that one can find in the company's 2.1 and 4.1 systems. They are loud. They are clear. They are 500 watts of power. Even better, the new Klipsch come standard with six-channel, analog audio support. As long as you have a 5.1 soundcard (such as the Sound Blaster Live! 5.1 or Philips Acoustic Edge), you need not worry about an external digital decoding box. Just set up the speakers, hook them to your soundcard, and your theater installation is complete. Klipsch rushed us this new 5.1 system specifically for Dream Machine deployment, and we're almost sure that *Maximum PC* is the first computer magazine to have tested the system. In a word: breathtaking.

- **MONITOR:** Though impractical for use with typical PC applications, high-res projectors offer a world of possibilities for entertainment systems. In a dream projector, we demand a clean, bright, 1024x768 picture and a bulb life of at least 2000 hours. The **NEC MultiSync VT540** meets all of our criteria. Want a truly immersive DVD experience? The MultiSync can project a 300-inch diagonal image (if you can move the projector 40 feet from the projection screen, that is!). When the time comes to make the Dream Machine HDTV capable, the NEC will still be able to accommodate our display needs, as it supports all three of the main HDTV resolutions: 1080i, 720p, and 480p.

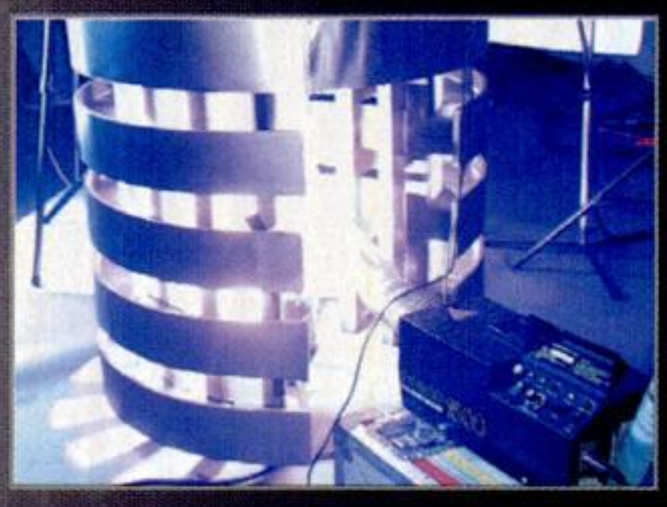
UNDER THE ARMOR

Given the diminutive size of The Great Entertainer's armor, it's hard to imagine that a true Dream Machine-caliber assortment of components could fit inside. But dreamy they are, and fit they did...

THE LIST

Here's an inventory of every single part that comes with The Great Entertainer.

Case Depot 4U R160B www.casedepot.com	**$250**
PC Power and Cooling Silencer 275 www.pcpowerandcooling.com	**$80**
Blue IDE cables www.plycon.com	**$30**
Intel Easton 2 motherboard www.intel.com	**$120**
Intel 1.2GHz Pentium III www.intel.com	**$340**
256MB Crucial Technology PC133 www.crucial.com	**$40**
GeForce2 MX w/ Personal Cinema www.nvidia.com	**$250**
Sound Blaster Live! MP3+ 5.1 www.soundblaster.com	**$90**
Three Maxtor 540DX hard drives www.maxtor.com	**$900**
Promise FastTrak 100 TX2 www.promise.com	**$95**
Pioneer DVR-103 www.pioneerelectronics.com	**$1,000**
Klipsch 5.1 www.klipsch.com	**$400**
NEC VT540 projector www.nec.com	**$4,000**
Micro Innovations Micro Stealth www.mic-innovations.com	**$50**
Microsoft Windows ME www.microsoft.com	**$165**
Intervideo WinDVD 3.0 upgrade www.intervideo.com	**$60**
Total *Maximum PC* price:	**$7,870**
Total price if machine were built by the U.S. government:	**$139,653**



Classified Photos!
For a behind-the-scenes peek at the making of Dream Machines 2001, go to **www.maximumpc.com**.

■ **Motherboard:** For our mobo choice, we weren't concerned about overclocking features. After all, the machine needs to be left on 24/7 for TV recording duties, and we didn't even want to *think* about overheating and reliability issues. We did, however, need a board with the Intel 815EP step B chipset, which is necessary to support our CPU of choice. So we landed on the **Intel Easton 2,** a rock-solid mobo with onboard Ethernet and ATA/100 support.

■ **CPU:** We disqualified the Athlon and Pentium 4 because they require too much cooling, and cooling creates noise. But we still wanted power. Enter the **Intel Pentium III Tualatin**, which we stole from Intel in the dead of night (OK, we didn't actually steal it—but our unit was in fact an engineering sample that we managed to finagle from an Intel intelligence op). The Tualatin is based on a new 0.13-micron process that shrinks both core size and thermal output. At 1.2GHz, the CPU gives us plenty of performance and helps lower the noise of our entertainment machine to more-than-acceptable levels. The Tualatin is an extremely efficient piece of engineering. It runs so cold, in fact, we were able to disable its heatsink fan for more than an hour without lock-ups. With a larger heatsink and able case fan, we're confident you could eliminate the whine of the CPU fan altogether.

■ **Memory:** Because The Great Entertainer isn't charged with any memory-intensive duties, we felt **256MB** of **Crucial CAS2 PC133** would do just fine.

■ **Videocard:** We were more concerned with our videocard's TV tuner and TV time-shifting features than its raw 3D acceleration power. We originally chose the ATI All-in-Wonder, but changed our minds after **nVidia** blew us away with its new TV-tuner add-on, the **Personal Cinema**. The Personal Cinema kit includes a daughtercard that replaces those found in most nVidia-based videocards with S-video-out support, a breakout box for all necessary A/V connections, and a remote control. If you haven't already heard about this dynamo, don't be alarmed—we received an engineering sample just days before final Dream Machine deployment. The most kick-ass thing about the Personal Cinema is that its remote control integrates with Intervideo's *WinDVD* software DVD player, as well as *WinDVR*, which lets you record TV directly from the tuner. To switch from DVD playback to TV-recording duties, all you need to do is mash a button on the remote. We plugged our Personal Cinema daughtercard into a **GeForce2 MX400** reference board from nVidia. The graphics company isn't yet slating the kit to ship with GeForce3s, but the kit is technically able to work with any nVidia chipset from GeForce2 on up.

■ **Soundcard: Creative Lab's Sound Blaster Live! MP3+ 5.1** was an easy pick. The card is already equipped to pump audio to our analog Klipsch 5.1 speaker set, and it can also pass an AC-3 stream to an external 5.1 decoder if need be. We passed on the fancier version of the Live! that includes the Live! Drive, because there's no need for the extra front-panel connectors. Other cards with external breakout boxes were also out of the running.

■ **Hard drives:** Everyone knows that 7200rpm IDE drives perform well, but they also make a lot of racket. So we chose a trio of the brand-new **Maxtor 540DX** drives, which pack an amazing 40GB per platter and spin at a nice, quiet 5400rpm. These drives are so mild-mannered, in fact, we weren't sure they were even on. We set the first 80GB drive as our primary boot drive, then striped the remaining two drives into a 160GB RAID 0 partition using the **Promise FastTrack 100 TX** controller. Using varying recording resolutions, we were able to capture about a week's worth of TV without even dipping into the 80GB of storage on our primary hard drive.

■ **Optical drives:** Is DVD-RW the best optical recording solution ever? No. Does DVD-RW let you burn TV shows to media that plays on most consumer DVD decks? Hell yes! Using Sonic's *MyDVD* and the **Pioneer DVR-A03** DVD-RW drive, we successfully mastered discs with custom navigation menus. How compatible is the DVR-A03? Very compatible. Even when burnt in rewrite mode, our DVD-RW compilation discs played on several DVD decks, including a Divx deck (and if you want obscure, there's nothing more obscure than a Divx deck).

■ **OS:** We just can't wait for Windows XP to arrive. Unfortunately, for now, we're saddled with **Windows Millennium**. Sure, the OS imposed a 4GB file limit, but the *WinDVR* program breaks up recorded content when it reaches Windows' limit.

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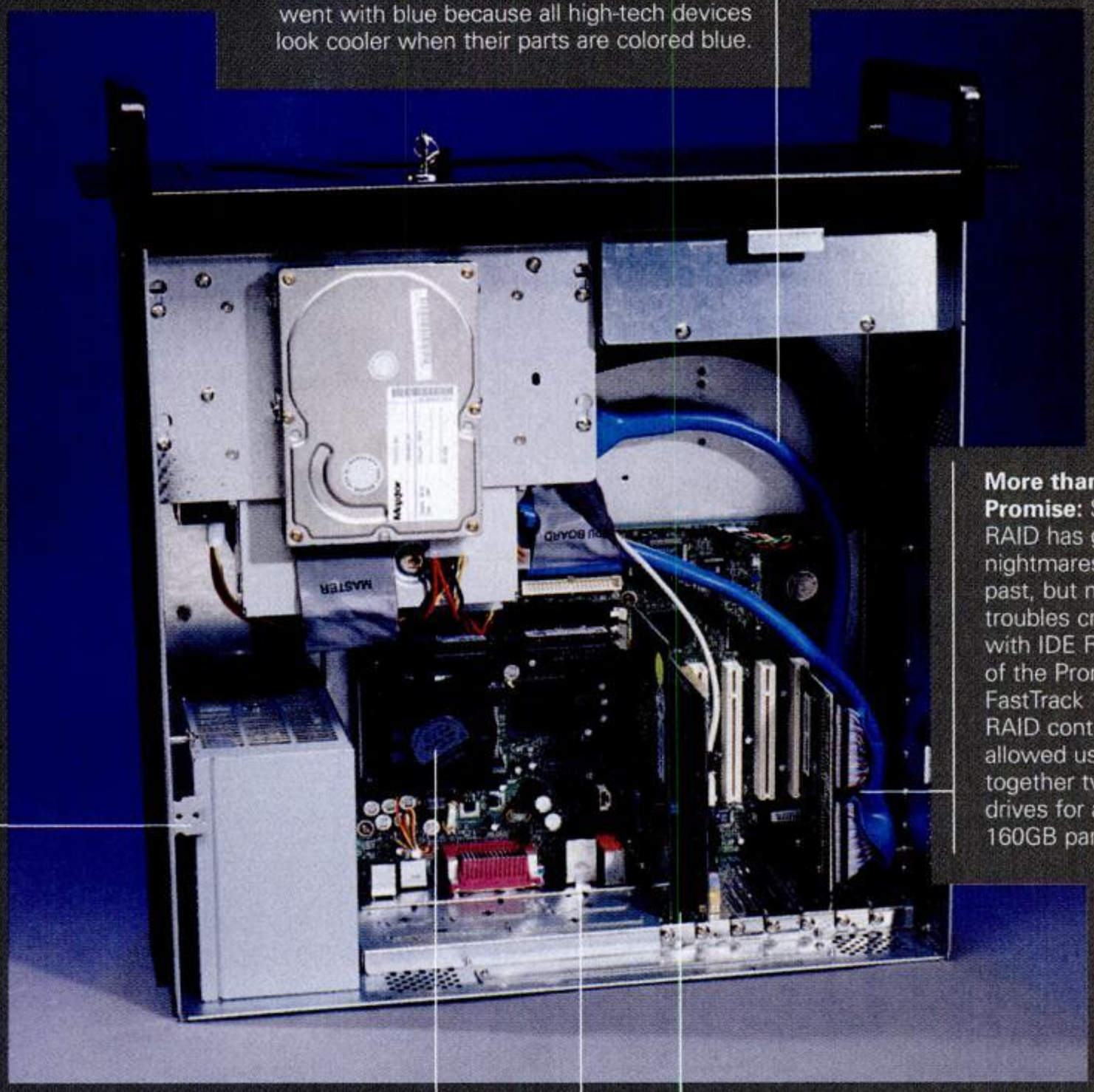
TiVoriffic!: The Personal Cinema breakout box is The Great Entertainer's heart and soul. Unlike TV tuner/TV-time-shifting solutions from Matrox and ATI, the Personal Cinema comes with a remote control—a remote control that's so well-integrated with the kit's DVD and PVR software, the end result is functionality eclipsed only by TiVo itself. The breakout box employs the same Philips TV tuner found in the Matrox and ATI solutions.

Round, round, get around, we get around: These rounded IDE cables help increase air flow and reduce clutter-factor—and they're snazzy, too! They're available in red and yellow, but we went with blue because all high-tech devices look cooler when their parts are colored blue.



More than a Promise: SCSI RAID has given us nightmares in the past, but no such troubles cropped up with IDE RAID care of the Promise FastTrack 100 TX RAID controller. It allowed us to stripe together two 80GB drives for a single 160GB partition.

Quiet on the set: PC Power and Cooling's Silencer 275 is whisper-quiet and supplies reliable power.

Strong, silent type: Maxtor's 80GB 5400rpm drives make far less noise than the average high-performance 7200rpm hard drive.

Cool like Fonzie: Intel's new Tualatin P-III could be the coolest 1.2GHz CPU we've tested. This next-gen 0.13-micron CPU could probably run quite reliably without active cooling.

LAN aboard, LAN aboard!: With the Easton2's onboard support for Fast Ethernet and CAT5 cabling, we can easily transfer video footage from The Great Entertainer to The Fridge for image-editing.

A good fragger: nVidia's GeForce2 MX isn't as powerful as the GeForce3, but you won't need that kind of power in your living room for at least another six months. The GeForce2 MX is more than suitable for anything but hardcore gaming, and its Personal Cinema option is the true heart of our entertainment rig.

ESSENTIAL ENTERTAINMENT AMMUNITION

Must-have applications for couch-bound PC nuts

You're on your own when it comes to choosing DVD movies, but here are *our* picks for all the software that needs to be loaded into a killer PC entertainment center.

DVDit! SE 2.3: This DVD authoring program will help you slap together a compilation of home movies complete with thematic menus, background music, and an obligatory "deleted scenes" section. **$500, www.dvdit.com**

WinDVD 3.0: All videocards that ship with nVidia's Personal Cinema breakout box should include *WinDVD 3.0* software DVD decoder. Why? Because if you don't use *WinDVD 3.0*, the breakout box's remote control won't work. And remember: If you also want your 5.1 speakers to work in full effect, you need to upgrade *WinDVD 3.0* to the multichannel version (at least all of the preceding was true when we built the entertainment rig). **$60, www.intervideo.com**

pcAnywhere 10.0: Because The Great Entertainer is hooked up to a broadband connection, it's a snap to remotely connect to the machine using Symantec's *pcAnywhere* and tell it to record channels. You won't be able to watch the shows remotely, but at least you won't miss that episode of "The Sopranos" in which Silvio performs elective surgery on a parking control officer. **$140, www.symantec.com**

Jukebox: If you play MP3s, you need *MusicMatch Jukebox*. This app will rip, encode, and catalog your digital music in one fell swoop. Burns CDs, too! **$20, www.musicmatch.com**

Essential movies: It is our box, after all, so here are our DVD picks:

Jon: *Goodfellas*
Katherine: *Requiem For a Dream*
Gordo: *Magnificent Seven Collectors Edition*
Kristen: *The Three Amigos*
Will: *The Muppet Movie*
Rob: *The Longest Day*
Logan: *Crouching Tiger, Hidden Dragon*
Ed: *Fight Club*
Christopher: *Blade Runner: Director's Cut*

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THE CONTENT CREATION BOX

"This isn't a

When we unsealed the content creation box's gestation tube, we could hear whispered in the wind the Admiral Jackie Fisher quote: "Fear God and dread naught." After that chilling event, it wasn't hard to designate a leader for our Dream Machines triumvirate. The dreadnaught—heretofore known as "The Fridge"—is the biggest, baddest, and most well-equipped of our three PC warriors. It's also designed to combat the "not enoughs" of life: not enough storage, not enough memory, and not enough CPU power.

Not enough, you ask? The only thing this box doesn't have enough of is patience for dawdling processing jobs.

We know—you think The Fridge is overkill. You think you'll never need more than a 500MHz P-III and a nice tailwind behind you. Well, you're dead wrong. Editing audio, video, and still-image files demands *a lot* of processing power and bus bandwidth. Open up any sizeable project in Adobe *Premiere*, and you'll find even 1GHz desktops gasping for air. And let's not even talk about resampling a 600MB audio file, or a serious 3D rendering chore. For the kind of work in which a faster CPU and greater memory capacity can shave minutes, or even hours off of processing times, you'll want to hit the tasks at hand with the most decadent configuration possible.

Storage capacity also comes into play, especially when dealing with uncompressed digital-video files, which eat up gigabytes faster than Cool Hand Luke ate eggs. Most desktop configs balk at receiving more than two hard drives. Our Fridge, however, starts with *three* drives good for almost a third of a terabyte of storage.

To survive hardcore content creation, you have to enter the battleground with a scorched-earth policy. You can't just contain the enemy—you must teach it a lesson it will never forget. Batch processing 30 *Photoshop* files in 15 minutes is all fine and dandy, but why wait even that long if a better computer will get you out the door sooner? Indeed, watching The Fridge cut a swath through intense processing chores is, well, a sight to behold.

For now, our superbox has more than enough power to destroy any project thrown its way. And with its cavernous case and stable CPU roadmap, it's primed to serve on the first line of defense for several years.

CODENAME: THE FRIDGE

CLASS: Dreadnaught

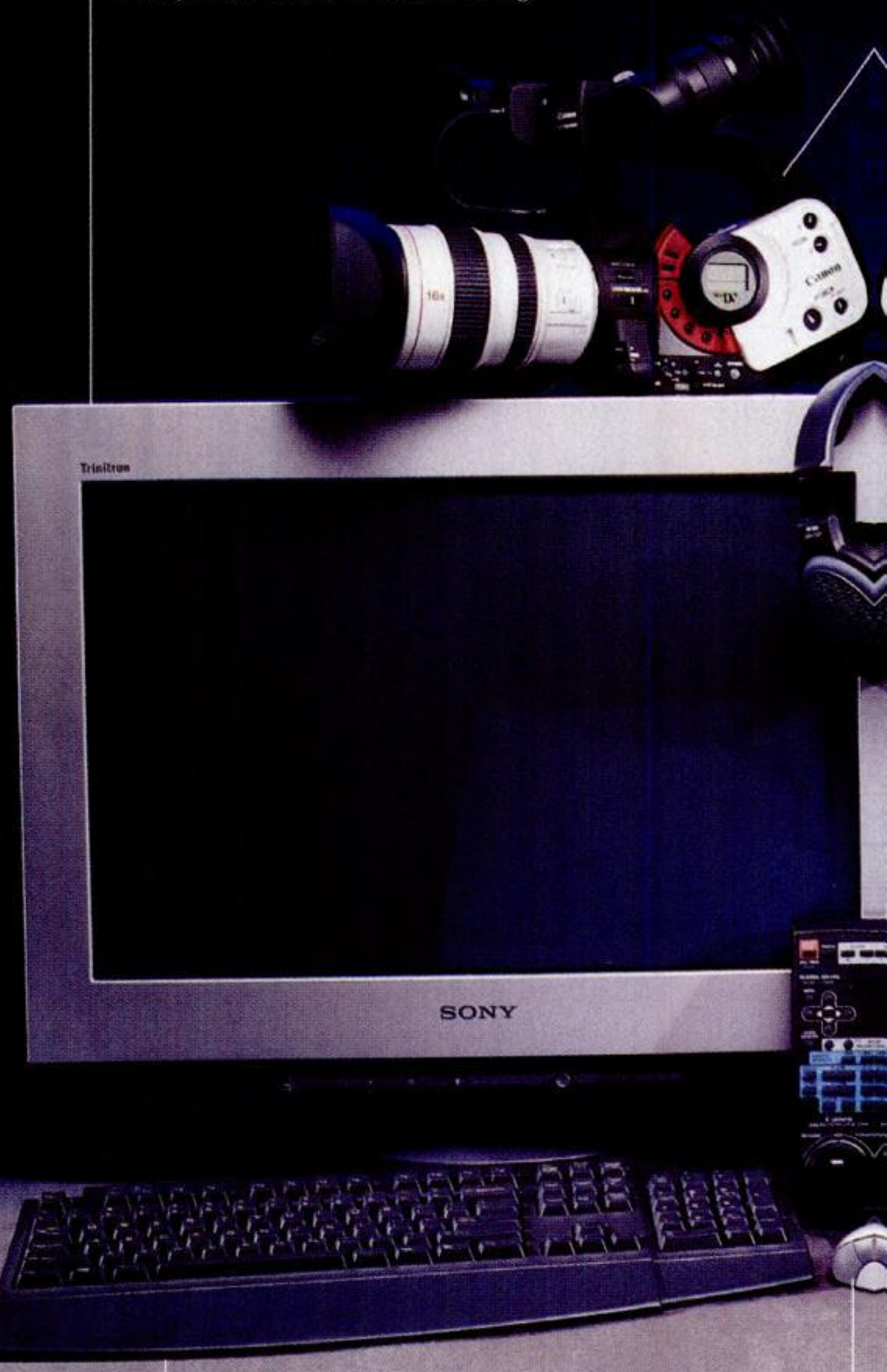
EXPERTISE

Capable of unleashing hell upon multimedia authoring projects. From *Photoshop* to *Premiere* to *SoundForge*, no content-creation application in the known universe can withstand its withering salvos of CPU, memory, and hard-drive firepower.

PRIMARY ARMAMENTS

Two 1.2GHz Athlon MPs, four 256MB sticks of DDR memory, two 10,000rpm SCSI drives, and an eclectic assortment of cameras and input devices.

Fat but flat: That's right, we decided to go with a CRT. Sure, super-large, wide-aspect-ratio LCDs from SGI and Samsung might be sexier, but any CAD designer using the content creation rig will need the flexibility of multiple resolutions—and all LCDs are essentially stuck at just a single res. Not so with the Sony FW-900. It's as flat as an LCD, offers indulgent amounts of real estate, and hits multiple resolutions without flinching.



Clickety-clack: For lengthy workstation marathons, we wanted a keyboard with a wrist rest and a slightly softer touch than the Keytronic Designer. The IBM Active Key fits the bill *and* comes with two USB ports.

Robo-Mouse: We don't care what Apple says, complicated applications require more than one mouse button. The Microsoft Intellimouse Pro can be set up to execute special commands, and its optical innards offer more precision than a mechanical ball mouse and never need be cleaned.

schoolyard scuffle, it's all-out war —and I want the fastest, most fully equipped war machine you've got."

You gotta pay to play: It might cost $3,800, but that's the cost of entry into the prosumer DV camera club. In fact, the Canon XL1 is as close to pro as you can get without selling your car. The camera features interchangeable lens support and a generous 5.5-88mm focal range (which is de rigueur for depth-of-field nuts like us).

Ride 'em, cowboy!: The Antec SX1440B server case is so strong, you could hook it up to a Honda engine and ride it piggyback to the local Fry's. The motherboard tray pops out for easy servicing, and the interior sports 14 drive bays as well as support for redundant power. We weren't about to paint the bezel of our precious DVD burner black, and we didn't have to, thanks to a door that conveniently hides the mismatched drive. The SX1440B came with eight 80mm fans, which proved more than sufficient during heat-intensive benchmarking drills.

Loud and proud: Only two vendors made a clean sweep of all three Dream Machines and one of them is Klipsch. If you have to wonder why, you obviously haven't heard the ProMedia 2.1s cranked up to full blast.

Get the red out!: One of the Coolpix 995's best features is its pop-up flash: It helps reduce red-eye, and if you don't voluntarily pop it up, you don't have to worry about it going off when you don't want it to. We also like the camera's optional fisheye, wide angle, and telephoto lens attachments.

Artsy-fartsy: Yes, some PC users *are* artistically inclined. And the drawing tools in art programs such as Adobe *Photoshop* and MetaCreations *Painter* take on a whole new dimension when used with a pressure-sensitive tablet like the Wacom Intuos.

THE LOAD OUT

In order to complete its mission, we equipped The Fridge with a full complement of top-of-the-line peripherals:

- **CASE:** The Antec SX1440B is the largest case we've worked with as a staff. It's so large, in fact, that it's essentially divided into two halves. One half is home to your extended ATX mobo, while the other hosts all of your drive bays, each of which boasts a rail system for easy installation and removal.
- **MONITOR:** The wide-aspect-ratio **Sony FW-900** was designed with content creation in mind. It's perfectly flat, and with 24 diagonal inches of screen real estate, it can display two-page magazine spreads at actual size. Add in a max resolution of 2304x1440 and Sony's superlative aperture-grille image quality, and you have the best, simply the best.
- **SPEAKERS:** This is a content-creation box, folks, not a portable movie theater or disco. So we chose the best stereo speaker kit we know of: the **Klipsch ProMedia 2.1**. No other stereo PC speakers come close to the clarity, warmth, and power of the ProMedia 2.1s. Of course, audio producers will want to wire their PCs to the high-end monitors in their home studios, but the 2.1s provide a great alternative for MIDI sequencing and rough track-editing tasks that don't require pro-audio precision. For times when you need to keep music to yourself, a pair of Sennheiser HD560 headphones round out the audio package.
- **TABLET:** Any serious digital artist needs a USB drawing tablet. The **Wacom Intuos Special Edition 9x12 Tablet** features 1,024 pressure levels and 2,540lpi of resolution.
- **DIGITAL CAMERA:** We were tempted to choose the Nikon D1, but at almost $4,000, we felt that digital SLR camera was out of the true "consumer" price range. So we "settled" on the **Nikon Coolpix 995**, which features a pop-up flash, 4x optical zoom, adjustable color saturation levels, and white balance. Its true 3.3-megapixel resolution isn't achieved by any wily interpolation tricks, and its excellent image quality propels the camera to the top of the high-end consumer heap.
- **DV CAMERA:** The **Canon XL1** features a 16x optical zoom, superior audio quality, and, most importantly, the handle and feel of a real camera. The camera's color reproduction leans toward the reds, providing footage with an overall warmer tone. Throw in some readily accessible controls for shutter speed and white balance, and you begin to see why the XL1 is a tool for serious film-makers.

UNDER THE ARMOR

If you think The Fridge's peripherals are decadent, you'll find its core components to be downright depraved. We decided to stuff The Fridge with the best—and once we determined "the best," we double-ordered and super-sized the entire menu.

THE LIST

Here's an inventory of every single part that comes with The Fridge.

Antec SX1440B www.antec-inc.com	**$500**
NMB 460-watt Athlon power supply www.nmbtech.com	**$125**
Tyan Thunder K7 www.asus.com	**$500**
Two 1.2GHz AMD Athlon MPs www.amd.com	**$500**
Two Thermalright SK-6 heatsinks www.thermalright.com	**$100**
1GB Crucial DDR registered PC2100 www.crucial.com	**$200**
Elsa Gloria DCC www.elsa.com	**$800**
Echo Audio MIA www.echoaudio.com	**$250**
Creative Labs SB Live! Value www.soundblaster.com	**$50**
Canopus DV Storm capture card www.canopuscorp.com	**$1,650**
Two 70GB Seagate 73LPs www.seagate.com	**$1,600**
180GB Seagate Barracuda 180 www.seagate.com	**$1,900**
Pioneer DVR-103 www.pioneerelectronics.com	**$1,000**
Klipsch 2.1 www.klipsch.com	**$175**
Sennheiser HD580 www.sennheiser.com	**$260**
Sony GDM-FW900 www.sony.com	**$2,000**
IBM Active Response keyboard www.ibm.com	**$50**
Microsoft Intellimouse Explorer www.microsoft.com/hardware	**$70**
Wacom Intuos 9x12 www.wacom.com	**$430**
Nikon CoolPix 995 www.nikon.com	**$890**
Canon XL1 DV Camera www.canon.com	**$3,800**
Microsoft Windows Professional 2000 www.microsoft.com	**$250**
Total *Maximum PC* price:	**$17,100**
Total price if machine were built by the U.S. government:	**$303,440**

■ **Motherboard:** The **Tyan Thunder K7** represents the zenith of Athlon mobo technology. This extended ATX board supports dual Athlons and up to 3.5GB of PC2100 DDR SDRAM, and comes with dual-channel Ultra 160 SCSI, dual 10/100 Ethernet, and five 64-bit PCI slots. The Thunder K7 needs its own proprietary power supply and a minimum of 450W, but that's a small price to pay for dual Athies.

■ **CPUs:** We went with dual **1.2GHz Palomino Athlons**. Why not Pentium 4? Because our benchmarking exploits have demonstrated that the Athlon architecture is faster in many critical applications. This certainly wouldn't be the case if more software apps supported Intel's SSE2 instructions, but the development of content-creation apps moves at a relatively slow pace, and many software developers haven't rewritten their code to appease the small cadre of Pentium 4 owners. OK, so we went with dual Athlons—but why not dual 1.4GHz T-Birds instead of dual 1.2GHz Palominos? Because the 1.4s aren't qualified for multi-processing configs, and the new Palominos support SSE (the first iteration of SSE, that is) and boast some caching schemes that pay off in significant performance dividends.

■ **Memory:** If you've ever edited a 1GB media file, you understand the need for shopping bags full of RAM. We turned to **Crucial Technologies** for **1GB of registered DDR SDRAM** memory. The Thunder K7 supports up to 3.5GB, but we decided not to be too greedy. Besides its increased bandwidth over PC133, PC2100's greatest feature is its cheap, cheap price. You can't say that about RDRAM.

■ **Videocard:** The best videocard for CAD and 3D modeling is 3DLab's Wildcat 5110. However, we had to pass on this card, not because of its hefty $3,500 price tag but because it wouldn't support the overlay features that our Canopus DVStorm RT capture card requires. That makes our pick—the **Elsa Gloria DCC**—practically a steal at $1,000. Don't get us wrong: The Gloria DCC is no slouch when it comes to CAD, 3D modeling, and even the occasional game. In fact, some will say it's just a GeForce3 with line anti-aliasing and special driver support for content-creation apps. Either way, the Gloria DCC fit our bill perfectly for a multi-role workstation card.

■ **Soundcard:** We wanted to make beautiful music with our Dream Machine, but several of the top audiophile soundcards simply don't support Windows 2000. So, to get the best of both the MIDI and audio worlds, we opted for dual soundcards. We chose the venerable **Sound Blaster Live!** card for MIDI duties and turned to **Echo Audio's Mia PCI** soundcard for audio production.

Even though the Sound Blaster Live! uses Creative's proprietary SoundFont MIDI architecture, we love the card's super-low latency. In fact, the Sound Blaster Live!'s MIDI latency is so low, you can trigger scores of MIDI notes simultaneously without causing a perceptible lag in playback—a feat that even top-of-the-line stand-alone samplers can't duplicate. Best of all, the tried-and-true Sound Blaster Live! drivers are solid performers under Windows 2000. The Mia PCI card, meanwhile, supports a whopping 24-bit resolution and up to 96KHz sampling rates. Its four balanced 1/4-inch input and output connectors make wiring your PC to a mixing console quick and noise-free. And under Win2000, the Mia plays nice with the Live!'s notorious IRQ hogging.

■ **Hard drives:** Content creation requires reliable hard-drive performance (for high sustained transfer rates) and considerable hard-drive capacity (to store gigantic sound and video files). To deliver performance, we went with a pair of **Seagate 73LPs.** Recognized as the fastest 10,000rpm Ultra 160 SCSI drives on Earth, the 73LPs are sustained-transfer-rate kings and hold 70GB each. But 140GB of storage wouldn't be enough for many video-editing projects, so we added a 180GB 7200rpm **Seagate Barracuda 180**—the largest consumer hard drive available, and another sturdy link in The Fridge's Ultra 160 SCSI chain.

■ **Optical drives:** If you want to burn your own DVDs for less than $1,000, the **Pioneer DVR A03** is the only game in town. At 4.7GB of capacity per disc, the possibilities are paralyzing. The A03 can also pitch in as an 8x CD-R and 4x CD-RW and includes buffer-underrun protection technology.

■ **FireWire capture card:** The **DVStorm RT** doesn't boast the realtime 3D effects of the Matrox RT2500, but it does have a breakout box that you can mount in your drive bay (and who needs realtime 3D effects when you can create wipes with Adobe *After*

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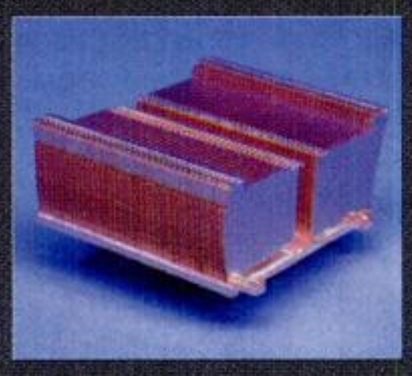
Seagate 180GB: Seagate's Barracuda 180 is the biggest hard drive consumers can buy. Sure, it spins at "just" 7200rpm, but this drive isn't meant to be the fastest drive in the end-user universe. It's just supposed to be the biggest. And it is.



Copper coolers: We didn't even consider overclocking The Fridge because when it comes to the intense number-crunching employed by media-editing algorithms, reliability is actually more important than clock speed. By the same token, we didn't want our Athlon MPs to think we were ignoring them, so to keep the CPUs downright frigid, we mounted a pair of Thermalright SK-6s. Unlike some heatsinks, which use aluminum or copper attachments, the SK-6s are pure copper and take full advantage of the material's prowess in transferring heat.

'Ten hut!: This black tubing is called "wire loom." It's typically used to bundle up electrical wiring in cars, but we used it to keep The Fridge's engine bay squared away like a Marine Corps barracks.

Wind tunnel: The Antec case boasts eight library-quiet 8cm fans—four to cool our hard drives, and four to keep air moving over the motherboard.

Ain't nothing but a G thing: The Elsa Gloria DCC employs a Quadro 2 chipset, which is based on the GeForce3. Its drivers are tuned for 3D workstation features such as line anti-aliasing, and include direct support for apps like 3ds max. It includes both 15-pin, DVI, and S-video outputs, and supports two monitors running simultaneously.

Effects?). The DVStorm RT also has two features that you'd be hard-pressed to find in any other prosumer capture card: (1) the ability to stream back footage from your PC to DV tape in realtime, and (2) chroma key capabilities that permit you to pull off crafty blue-screen tricks—such as superimposing your second cousin, twice removed, against a Martian landscape. The DVStorm RT also comes with a full version of *Premiere 6.0*.

■ **OS:** Our dual-processor needs forced us to reach for Microsoft Windows 2000 Professional. We loaded *Bug Patch 2* and wailed away on our apps.

ESSENTIAL CONTENT CREATION AMMUNITION

Must-have utilities for media hobbyists

Obviously, Adobe *Premiere*, Adobe *Photoshop*, and Discreet *3ds max* are must-have installs for any content creation box. But if you really want to get freaky, you have to look beyond the old software war-horses...

Reason 1.0: You could fill up your garage and empty your bank account buying vintage synthesizers and drum machines—but you don't have to. *Reason 1.0* puts six of them, plus samplers and effects, into your PC. **$400, www.propellerheads.se**

Sonar XL: The latest upgrade to Cakewalk's PC audio production suite adds handy tools for loop-based production and extends support for both hardware and software synthesizers and samplers. **$480, www.cakewalk.com**

After Effects: Wipes, dissolves, and transitions—everything a growing boy needs in order to touch up a film. **$650, www.adobe.com**

Sound Forge 5.0: Cut and splice audio tracks with sample-accurate precision, design custom effects, and master your audio for mass reproduction. **$500, www.sonicfoundry.com**

Knoll Light Factory: If you can't match your lighting, then have your computer plant the arcs for you. *Light Factory* is particularly handy if your director of photography screwed up your lighting or if you need to add a little lens flare to spice up the action. **$400, www.pinnaclesys.com**

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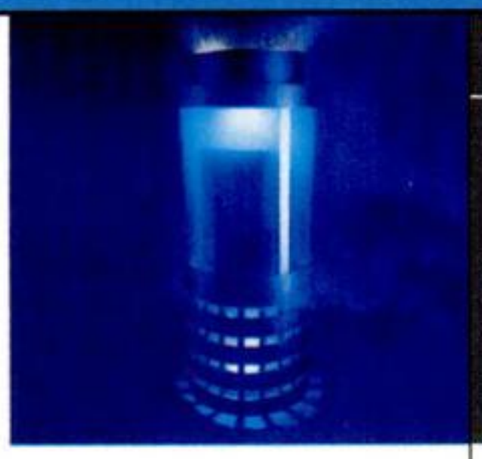
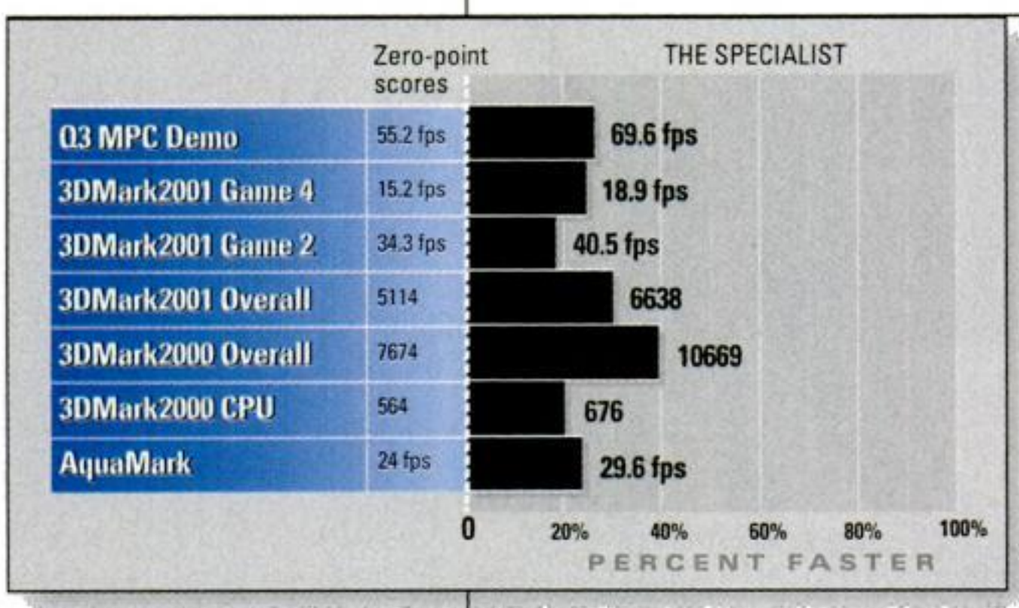
SHOOTING BENCHMARKS IN A BARREL



Surprise, Surprise: The Trio Broke 12 Lab Records

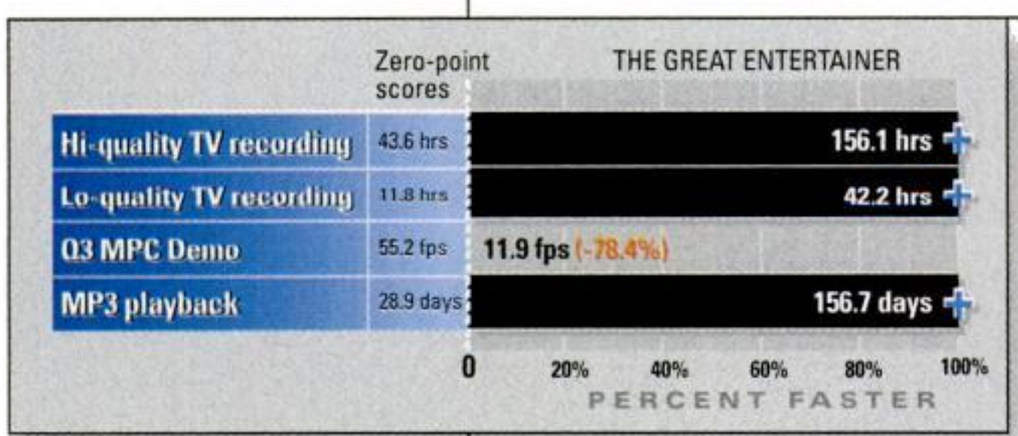
To gauge the speed of our dream squad, we pitted the machines against our standard zero-point Hewlett-Packard system, which is equipped with a 1.3GHz Pentium 4, 256MB of RDRAM, a 45GB hard drive, and a GeForce3. You can learn more about the zero-point system by visiting the "mag reprint" section of Maximumpc.com, but for now, please feast your eyes on the benchmarks. In a nutshell, the Dream Machines broke every single Maximum PC Lab performance record in existence.



THE GAMING RIG

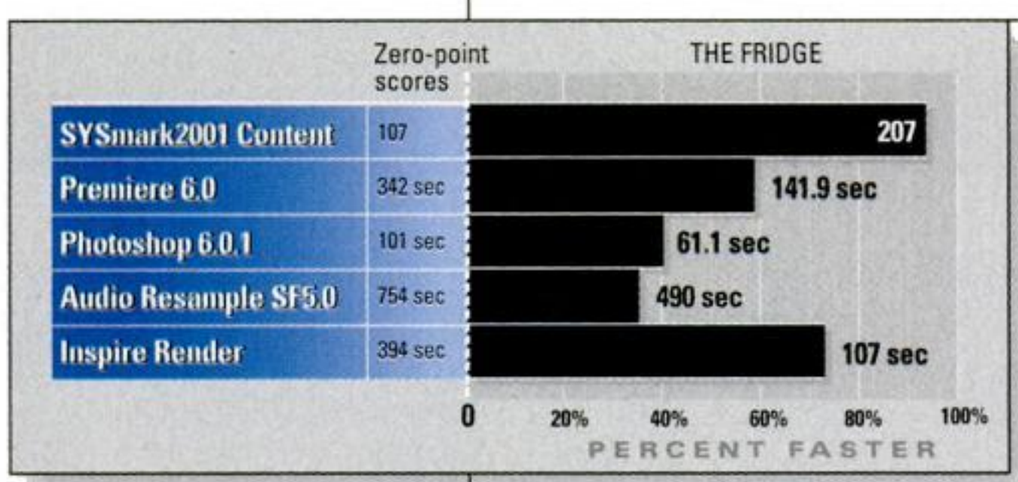
The Specialist is the fastest gaming rig we've ever tested. Its most decisive performance victory came in the overall *3DMark2000* benchmark, where it posted a 39 percent increase over our current zero-point system. For kicks, we also compared The Specialist's overall *3DMark2000* score to the score posted by last year's Dream Machine, which boasted a GeForce2 GTS videocard and dual 1GHz Pentium IIIs—the 2001 box registered a 61 percent speed increase (10,669 to 6,623).

Our punishing *Quake III Arena* demo also revealed great performance increases: The Specialist was roughly 26 percent faster than our current zero-point system. Over in the land of DirectX 8, a score of 18.9fps in *3DMark2001*'s Game 4 demo may not sound very impressive on paper, but that frame rate is actually very impressive when you consider that many Game 4 scores don't break double digits. The Specialist was 3.7fps faster than our zero-point system, which is good for a 24 percent performance increase. The gaming rig also turned in a very satisfying overall *3DMark2001* score of 6,638—that's nearly 30 percent faster than the score posted by our current zero-point system. For kicks, we also ran the cumulative *3DMark2001* benchmark on a stock 1.4GHz Athlon/GeForce3 rig. Here, The Specialist registered a 22 percent performance boost. We could go on and on, but you get the point.



THE PC ENTERTAINMENT CENTER

Because it's not a typical PC, there really isn't much to benchmark on The Great Entertainer. We did run our standard *Quake III Arena* benchmark, and, as expected, the GeForce3-equipped gaming rig destroyed The Great Entertainer, which just ain't no gaming machine, folks. Where The Entertainer *does* excel is in TV recording, DVD playback and burning, and PVR duties.



THE CONTENT CREATION BOX

The Fridge is truly a black monolith of performance. To prove as much, we ran a collection of benchmarks that would reflect the real-world activities of content creationists. For starters, we isolated the Content Creation portion of *SYSmark2001*. This portion of the *SYSmark2001* suite runs timed action scripts in Adobe *Photoshop 6.0* and *Premiere 6.0*, Macromedia *Dreamweaver 4* and *Flash 5*, and Microsoft *Windows Media Encoder 7*. The benchmark multitasks the different apps in various situations. The result: The Fridge hammered our stock Pentium 4 to the ground with a score that was 93 percent faster.

We also saw spectacular results with our Adobe *Premiere 6.0* benchmark. The Fridge finished about 200 seconds ahead of the zero-point system, good for a 58 percent increase. If we were *real* video editors who did nothing but *Premiere* work 60 hours a week, a bunch of 200-second performance gains could quickly add up and prove to be a godsend. In our *Photoshop 6.0.1* test, The Fridge crossed the finish line 40 seconds faster than our zero-point rig. It was also 32 percent faster than a dual 1GHz Pentium III setup we tested in August.

The rest of the benchmarks? Same story. The Fridge kicks ass. ■

NOTES: **Gaming Rig:** *Quake III* and *AquaMark* scores reported in frame rates; higher scores are better. All *3DMark* scores reflect the software's internal scoring system; higher scores are better. **Content Creation Box:** The *SYSmark2001* score reflects the software's internal scoring system; higher scores are better. The rest of the benchmark scores are reported in seconds; lower scores are better. **PC Entertainment Center:** To gauge how many minutes of high- and low-quality TV footage fit in the machine, we filled the rig's 160GB RAID 0 array. *Quake III* scores are reported in frame rates; higher scores are better. Want to know how many days' worth of MP3 audio fits inside 215GB? Try 157 days' worth.

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Beyond the 1x

A drive's performance rating—aka its X-rating—is no longer the ultimate measure of value. So what is? Our guide to what's ahead in optical storage technology explains what you need to look for in your next CD and DVD burners.

Four new recordable CD and DVD technologies will make their way onto store shelves during the next 12 months—and if manufacturers are to be believed, the result will be tripled CD-ROM capacities and recordable DVDs that'll let you play homemade video on your set-top DVD player. But the competition will be fierce, and the options won't be especially straightforward. Different companies will offer different capacity and recording options, all achieved by different technologies that are incompatible with one another. If you're looking to trade up to the latest and greatest, you'll need to know a lot more than just X-rating, which defines how fast an optical drive can transfer information: 1x describes an 150KB/sec transfer rate, 2x describes a 300KB/sec transfer rate, and so on all the way up to a heady 24x for today's hot 3.5MB/sec drives.

Despite the prospect of an ugly optical-technology standards war that might burn a lot of early adopters, PC fanatics still stand to benefit in the long run. Each of the technologies explained on the following pages offers some level of backward-compatibility with the drives and media you own today, and they're all being introduced at prices ranging from reasonable to ridiculously low. Which stands the best chance of survival, and which will end up being remembered in cave paintings? We'll explain which ones we think are marked for longevity and thus worth spending your money on.

CD BURNERS BULK UP

During the past year, we've been spoiled by the wide availability of affordable CD burners offering higher and higher X-speeds. Write speeds jumped from 12x to 16x to 24x, and as competition among CD manufacturers grew, consumers reaped benefits in the form of fatter software bundles and special features such as larger cache sizes and buffer underrun protection.

Today's CD drives are primarily distinguished by their special features rather than by their speed ratings. Why? Because optical drive speeds have finally hit a point of diminishing returns. Where the jump from 4x to 8x shaved minutes off the burning process, the difference between 20x and 24x write speeds is mere seconds. Why blow your cash on a new Yamaha 20x drive that burns a 650MB data CD

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Rating

BY LOGAN DECKER
ILLUSTRATION BY JARED SCHNEIDMAN

all of 47 seconds faster than the 16x model does?

There's just no getting around the laws of physics: The faster a disc spins, the louder the drive roars, and once speeds accelerate to around 40x, excessive vibrations render the disc difficult to read and make error-correction methods next to useless. If you go faster than 50x, the polycarbonate layer of the disc begins to deform, magnifying tiny physical imperfections in the disc's surface.

Two of the biggest heavyweights in optical technology, Sony and TDK, are competing to set the standard for the next generation of CD burners. Sony is emphasizing larger storage capacity with its Double Density Drive by fine-tuning the CD media format and shrinking the size of the component that focuses a drive's laser; this strategy can pack twice as much information onto a disc.

TDK aims to trump Sony by ratcheting up capacity *and* speed with MultiLevel technology, a recording process that uses a system of grayscale marks (instead of the traditional pits) to simultaneously triple capacity and transfer rates. Both Sony and TDK will try to corral users who are no longer satisfied with the capacity of conventional CD burners but aren't ready to move on to recordable DVD. It's unlikely, however, that both Sony's and TDK's formats will thrive amid cross-competition.

DVD WARS: EPISODE 1

Brave souls who are ready to jump into recordable DVD face an even closer race than the one that's heating up on the recordable CD front. It's been widely accepted for some time that recordable DVD is the future of optical drives. But the recordable DVD format is shaping up to be another VHS vs. Betamax pillow fight that ought to make apprehensive consumers out of even the most rabid early adopters.

In 1997, the DVD Forum—a consortium of 230 major electronics companies—was founded with the primary goal of establishing "a single format for each DVD application product... for the benefit of consumers and users." In this, the DVD Forum clearly did not succeed. The first standard established by the Forum was DVD-RAM, a caddy-based system that appealed primarily to its patent holders (Toshiba, Hitachi, and Matsushita). Pioneer responded with a format more appropriate for consumers interested in recording DVDs for home use; its DVD-R and subsequent DVD-RW were the first formats to introduce true compatibility with set-top DVD players. The DVD Forum, acknowledging the clear advantages of this specification for consumers, later grudgingly adopted all three formats as official standards.

This didn't sit well with some members of the Forum—namely, Sony and Philips, which didn't relish the idea of paying royalties to Pioneer. Those two companies eventually founded the DVD+RW Alliance with the intention of creating their own spec. Sony and Philips initially downplayed the DVD+RW spec (and its suggestion of mutiny from the DVD Forum), describing their goal as the creation of a data storage spec, not a video spec. Thus was born DVD+RW, which added better support for data access in non-video uses, as well as—surprise!—support for set-top compatible DVD-Video.

Strangely enough, the differences between the two recordable DVD formats are fairly minute, and it doesn't take a genius to figure out that the best thing for consumers would be a format merger. Unfortunately, it's more likely that our planet will be decimated by an army of drooling, ornery aliens than that these consortiums will disarm and make nice. So, what's a recordable-DVD enthusiast to do? A close look at the following pages will help you separate the wheat from the chaff.

Reprinted Material

Double Density CD-R/RW

DETAILS

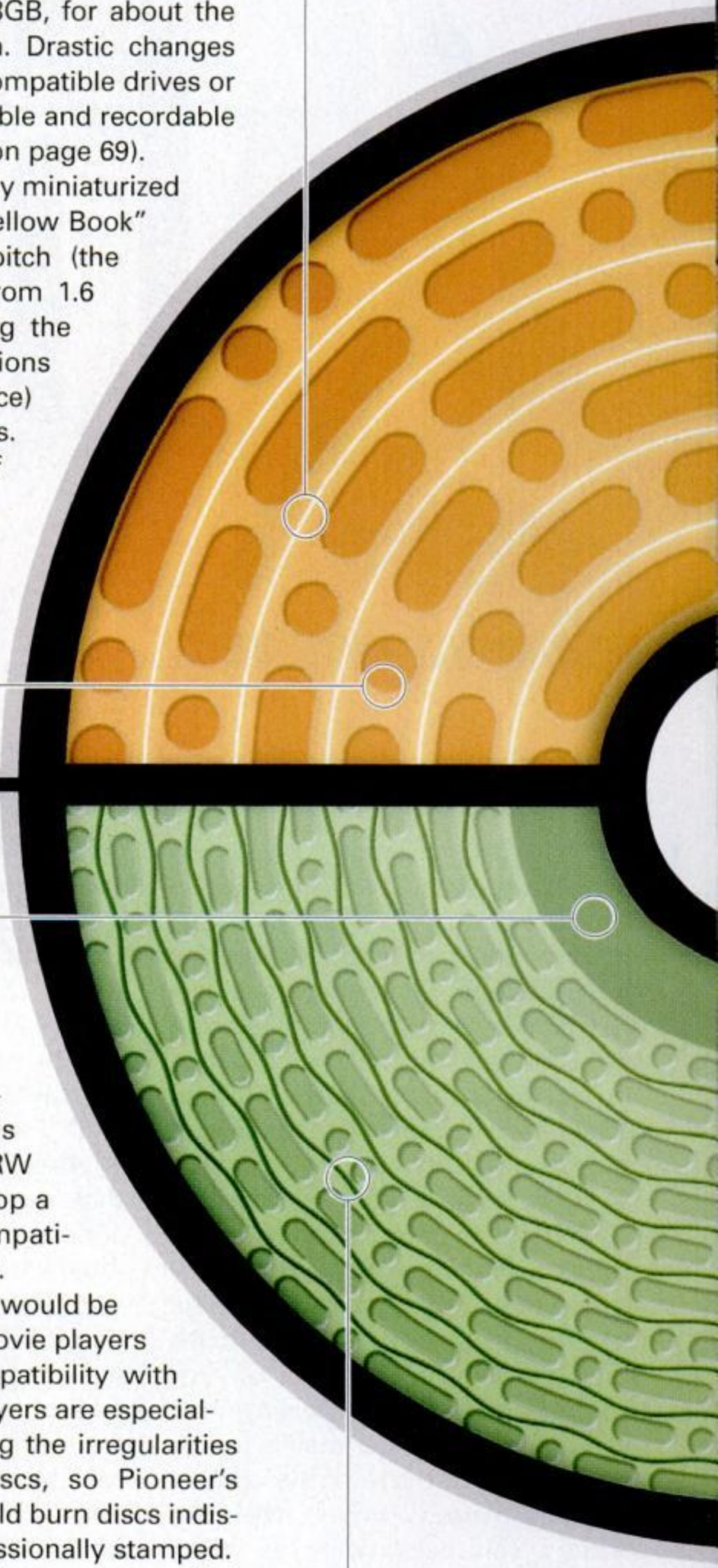
Also known as	**DD**
Max capacity	**1.3GB**
Drive cost	**$250**
Media cost	**$2 to $3**
Double-sided media?	**No**
Plays on	**DD-compatible drives**
Doesn't play on	**Traditional CD-ROM and DVD-ROM drives, or any of the other newfangled technologies mentioned in this article**
Integrated copy protection?	**No**
Who invented it?	**Sony**
Who's peddling it?	**Sony**
Is it out yet?	**Yes**
Prognosis	**Iffy**

Having developed the original CD spec in cooperation with Philips, it seems fitting that Sony should be among the first to introduce next-gen optical technology and its corresponding specification, known as "Purple Book." Double Density disks literally double the capacity of CD-Rs and CD-RWs to 1.3GB, for about the same price as current 650MB media. Drastic changes aren't necessary to manufacture DD-compatible drives or media, though DD media is only playable and recordable in a DD-compatible drive (see review on page 69).

So, how'd they do it? Sony essentially miniaturized the major elements of the original "Yellow Book" data-CD spec, shrinking the track pitch (the space between tracks on the disc) from 1.6 microns to 1.1 microns and reducing the minimum pit length (the tiny impressions that the laser reads from the disc surface) from 0.833 microns to 0.623 microns. This effectively doubles the amount of information that can be written to a disc. Sony also changed a parameter *(continued on p44)* ▼

Less is more: Sony's Double Density media shrinks the track pitch (the space between tracks on the disc) by 0.5 microns.

It's the pits: Double Density media shrinks the minimum length of each pit by slightly more than 0.2 microns.



Hands off: DVD-RW is unable to write to this area, which contains the copyright, region encoding, and encryption information on commercial DVD-Video discs.

The wobble groove: DVD-RW uses the wobble groove to help the drive calibrate the disc's rotation speed and position data on the disc without any gaps.

DETAILS

Also known as	**DVD-RW**
Max capacity	**4.7GB per disc side**
Drive cost	**$800**
Media cost	**$10 to $30**
Double-sided media?	**Yes**
Plays on	**DVD-RW drives, DVD-ROM drives, and set-top DVD players**
Doesn't play on	**CD-ROM drives, CD-R drives, and CD-RW drives**
Integrated copy protection?	**Yes**
Who invented it?	**Pioneer**
Who's peddling it?	**Pioneer, Compaq, Sony, Apple, NEC**
Is it out yet?	**Yes**
Prognosis	**Good**

First of all, it's pronounced "dash RW," not "minus RW"—no matter what the DVD+RW camp tells you. Pioneer designed the DVD-RW spec with one goal in mind: to develop a recordable format that would be compatible with existing set-top DVD players.

Pioneer understands that most of us would be reluctant to dump our existing DVD movie players in favor of new units that offer compatibility with recordable DVD media. Older DVD players are especially intolerant when it comes to reading the irregularities that often show up on burned discs, so Pioneer's challenge was to build a drive that could burn discs indistinguishable from those that are professionally stamped.

DVD-RW answers the challenge with a process called lossless linking. Lossless linking can append data blocks with new data, without the linking blocks used in the packet-writing strategy or the relatively imprecise laser-positioning involved in current buffer-underrun protection *(continued on p44)* ▼

DVD-RW

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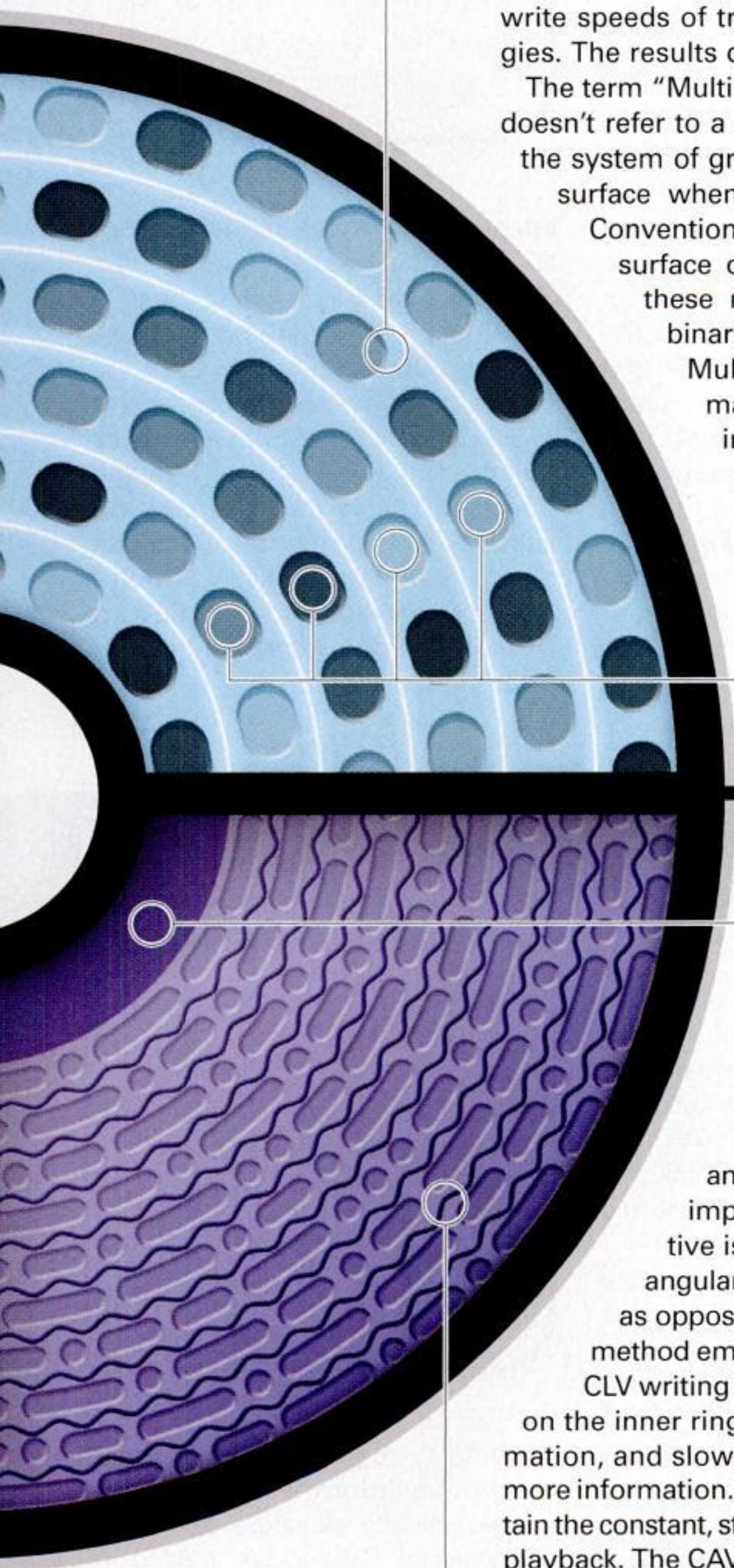
MultiLevel CD-R/RW



Spot check: MultiLevel discs use fairly uniform marks, as opposed to the varying pit lengths found on traditional media.

Developed cooperatively by TDK and Calimetrics, MultiLevel CD technology is (in our opinion) among the most ingenious ideas introduced to CDs since Beck. With minimal changes to hardware and media, MultiLevel *triples* both the capacity and write speeds of traditional optical recording technologies. The results define "kick-ass."

The term "MultiLevel" is a bit of a misnomer in that it doesn't refer to a multi-layered disc. Rather, it refers to the system of grayscale marks burned onto the disc's surface when data is recorded onto the media. Conventional drives burn tiny pit marks into the surface of a CD, and when the disc is read, these marks are interpreted in the classic binary tradition as either ones or zeroes. MultiLevel drives, on the other hand, mark the disc with tiny crescent shapes in one of eight shades of gray. These eight shades—after doling out most of their values for a reassuringly *(continued on p46)* ▼

More is more: Using shades of gray to represent multiple values for each "pit," MultiLevel discs offer three bits of data for every one bit on a conventional CD-ROM.

DETAILS

Also known as	**ML**
Max capacity	**2GB**
Drive cost	**Unknown**
Media cost	**$2 to $3**
Double-sided media?	**No**
Plays on	**ML-enabled drives**
Doesn't play on	**Traditional CD-ROM and DVD-ROM drives, or any of the other newfangled technologies mentioned in this article**
Integrated copy protection?	**No**
Who invented it?	**TDK, Calimetrics**
Who's peddling it?	**TDK, Plextor, Mitsubishi, and Sanyo**
Is it out yet?	**No, but it's due by the end of the year from Plextor**
Prognosis	**Very good**

Compliments of the MPAA: While DVD+RW is technically capable of duplicating the encryption area of commercial discs, users will be locked out by the firmware.

Backed by Sony, Philips, Hewlett-Packard, and Ricoh, DVD+RW uses essentially the same format and technology as DVD-RW, but with a few important differences. The most substantive is DVD+RW's use of the CAV (constant angular velocity) writing method for recording, as opposed to the CLV (constant linear velocity) method employed by DVD-RW.

CLV writing spins the disc at a variable rate—faster on the inner rings of the disc where there's less information, and slower on the outside rings where there's more information. This enables a disc being read to maintain the constant, steady stream of data necessary for video playback. The CAV method, on the other hand, spins the disc at a constant rate, so data transfers increase as data is written from the inner rings to the outer rings. (Most current optical drives use CAV.) The faster streams realized in the latter half of the disc can significantly improve random-access read times on *(continued on p46)* ▼

The wobblier groove: DVD+RW uses a higher wobble-groove frequency than DVD-RW, but it's questionable whether this provides better compatibility among set-top players, as it's intended to.

DETAILS

Also known as	**DVD+RW**
Max capacity	**4.7GB per disc side**
Drive cost	**under $600**
Media cost	**$20**
Double-sided media?	**Yes**
Plays on	**DVD+RW drives, DVD-ROM drives, set-top DVD players**
Doesn't play on	**CD-ROM, CD-R, CD-RW drives**
Integrated copy protection?	**Yes**
Who invented it?	**DVD+RW Alliance**
Who's peddling it?	**Sony, HP**
Is it out yet?	**No, due October 2001**
Prognosis	**Very good**

DVD+RW

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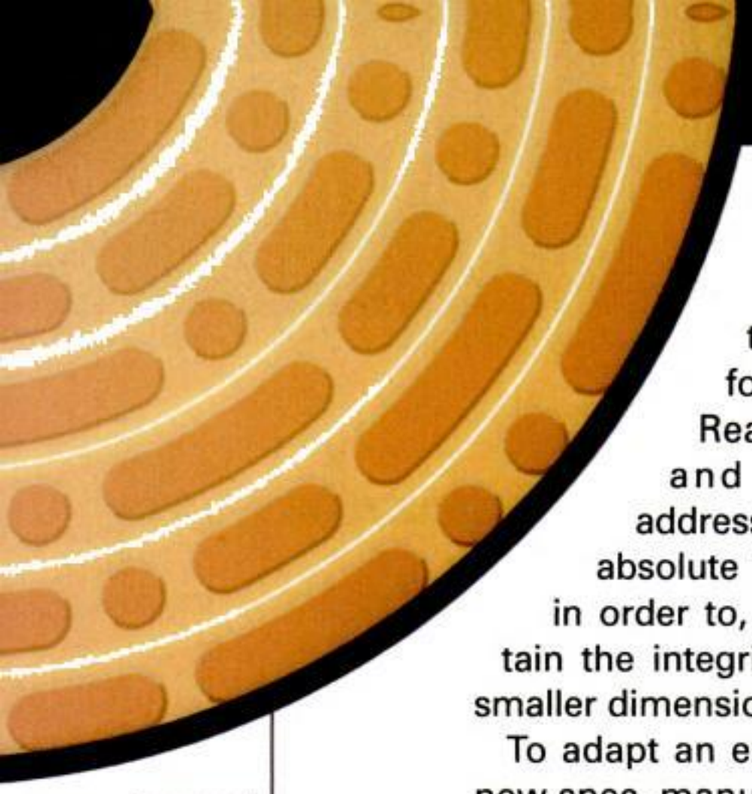


Double Density CONTINUED...

▲ *(continued from p42)*

in the error-correction scheme (CIRC, for cross interleaved Read-Solomon code) and expanded the address format (ATIP, for absolute time in pre-groove) in order to, theoretically, maintain the integrity of data at these smaller dimensions.

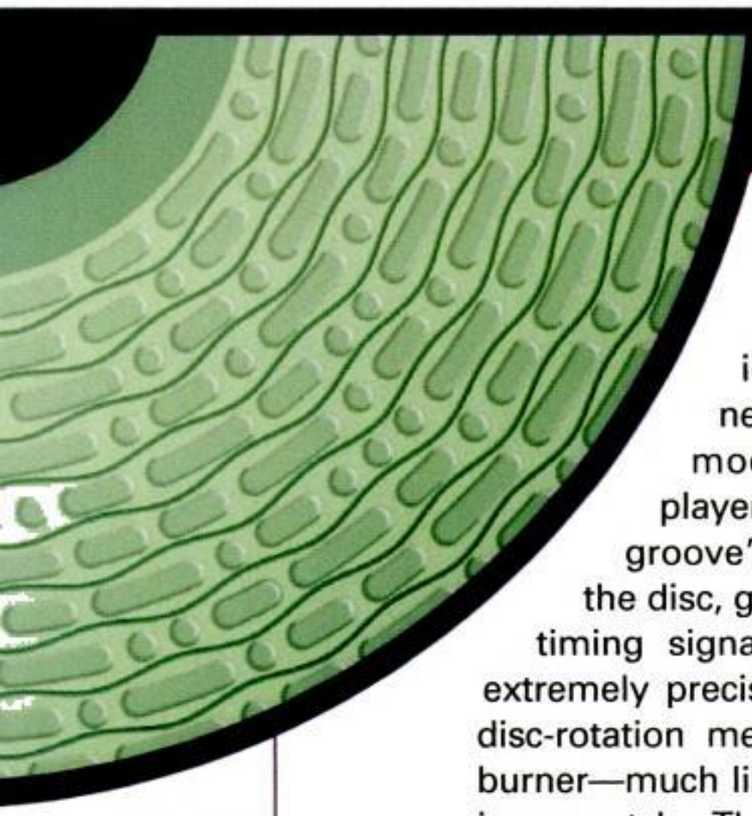
To adapt an existing drive to the new spec, manufacturers must add two inexpensive integrated circuits and shrink the numerical aperture (the hole through which the laser shines). But these additional components shouldn't mean much of a price hike, if any, for DD-compatible drives. Sony's own Double Density Drive debuted in April at the more-than-reasonable price of $250. The media itself costs $2 and $3 for DD-R and DD-RW media respectively, so go hog wild. Just remember that while a Double Density drive can read and write traditional CD-Rs and CD-RWs, conventional drives can't read Double Density discs. This could be the new technology's ultimate undoing: Unless a Double Density craze sweeps the nation, a huge installed base of CD, CD-R, and CD-RW drive owners will be cut off from all the fun. There's also another casualty with the adoption of a new spec: DD discs won't play in audio CD players, so there's no sense in recording CD audio to them. Nor do the drives conform to the upcoming Multiplay spec intended to standardize the way optical drives play compressed digital audio.

We're disappointed that the Double Density spec is saddled with the return to 12x write speeds. Sony explains that at the time of its original design, 12x was the trend in optical drives, so the first Double Density drives were designed to meet this target. And we were particularly dismayed by Sony's pathetic buffer-underrun protection of just an 8MB cache. Sony claims that future iterations of the DD drive will include better buffer-underrun technology as well as faster speeds, and is encouraging other manufacturers to adopt the Double Density spec. However, we have yet to hear of any other companies jumping onto the DD-drive bandwagon.

In a head-to-head comparison of DD and TDK's MultiLevel technology, MultiLevel easily thrashes Sony's DD in terms of speed and capacity. But Sony can make one claim that TDK cannot: Double Density drives and media are available right now, and at an affordable price.

HOW DOES CIRC ERROR CORRECTION WORK?

Data written to a CD is surrounded by a matrix of numbers that's used to confirm the validity of each bit on a disc. For example, if a scratch obscures a piece of the data, the drive might see it like this: 1 + [data error] = 9. Thanks to the error-correction bit, the drive knows the result is 9, so it extrapolates that the missing number is 8. This is about as simple an explanation as we can provide without using the word "algorithm."



DVD-RW CONTINUED...

▲ *(continued from p42)*

schemes. To achieve the accuracy necessary to accommodate set-top DVD players, a spiral "wobble groove" is stamped onto the disc, generating an analog timing signal that provides an extremely precise reference for the disc-rotation mechanism in a DVD burner—much like the quartz crystal in a watch. The burner uses the groove to calibrate the disc's rotation speed with "land pre-pits" that mark the physical space in which data blocks are to be written. These two elements provide very precise positioning for the laser, which is then able to join data blocks together, like a linear jigsaw puzzle, without any gaps between them.

Our tests on two different DVD-RW drives have shown that this scheme works very, very well. Our homemade DVD-Video discs played without a hitch in some very geriatric set-top players. Nonetheless, some players simply won't be able to deal with the new media. If you've got a cranky first-gen DVD player that resembles military gear, it might be confused by the lower reflectivity of DVD-RW media. The old player will think that it's dealing with a dual-layer disc and won't be able to read it.

If you invest in DVD-RW, be sure you buy the correct media: Version 1.1 RW media will play DVD movies in most, if not all, new set-top DVD players. Version 1.0 media won't play in stand-alone DVD players.

It should be noted that the DVD-RW spec emerged from DVD-R, which is divided into two categories: General (for consumers) and Authoring (for businesses). At nearly $10,000 more per drive, DVD-R for Authoring is aimed at professionals who create master discs for mass production. Aside from some minor differences in laser wavelength, the main difference between these two DVD-R specs is that the General spec is unable to write to the area of a disc that contains copyright, region encoding, and encryption information. Although it's technically possible to copy a commercial DVD-Video disc onto DVD-RW media, you won't be able to copy the encryption key necessary to play it.

While Sony is actually licensing DVD-RW drives from Pioneer for the latest iteration of its Sony VAIO computers, it also introduced a combo DVD+RW/DVD-RW standalone recorder at CEBIT 2001. It's unclear, however, whether this product will ever actually materialize on store shelves.

WHY DOES DVD RECORDING ONLY BEGIN AT 1X?

Pioneer's groundbreaking DVR-A03 records DVDs at 2x, which may not sound like much, but recordable DVD drives use a different multiplier to express their speeds. Where a 1x CD drive records at 150KB/sec, a 1x DVD drive records at about 1.32MB/sec (which is equivalent to a 9x CD-ROM drive).

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MultiLevel

CONTINUED...

▲ (continued from p43)

heavy-handed error-correction and nifty calibration scheme—leave three bits for data where a conventional CD would leave a single bit. All this voodoo magic triples the capacity of the disc, the speeds at which data is read, and the speed at which data is recorded.

ML's recording strategy integrates the same basic principles found in packet-writing for CD-RWs (packet-writing writes data to discs in discrete blocks, instead of in tracks that form a continuous spiral, which is the technology found in CD-R media). As a result, ML discs will provide the same drag-and-drop functionality you enjoy with conventional CD-RWs, but with three times the capacity and three times the speed. As for buffer-underrun protection, this coaster-busting technology will be integrated in all ML drives. Buffer-underrun protection—such as Burn Proof—pauses a drive's laser when a drive's cache is starved of data, then resumes recording when the data buffer is full again. And, finally, the kicker: TDK states that ML write speeds will *begin* at 36x. This is crucial, because a large-capacity disc isn't much fun to use if it takes forever to write to it. In fact, that's our chief complaint about Sony's Double Density drive: It takes 12 minutes to fill up a 1.3GB DD disc at 12x write speeds. Still, ML drives suffer from a few of the same foibles that plague DD drives, such as the fact that you can't use ML media to create CD-audio discs, and that ML discs cannot be read by or recorded on conventional CD burners.

ML technology doesn't require any new optical components, so manufacturers can make their drives ML-compatible with a single chip that should cost between $22 and $25. TDK expects its first drives and media to arrive in the second quarter of 2002, once it begins receiving chips from Sanyo, the exclusive manufacturer of ML chips. And while ML, like DD, doesn't conform to the upcoming Multiplay spec, TDK is negotiating with manufacturers to include the chip with stand-alone CD players. Plextor, also part of the ML alliance, intends to introduce its own ML drive by the end of the year. ML media will hold 2GB and cost about $2 and $3 a piece for recordable and rewritable media, respectively—the same prices as Sony's 1.3GB discs.

If TDK can drum up support from consumers and manufacturers, ML has an extremely bright future. TDK is already looking into extending the grayscale values of the burn marks, as well as developing a 12cm ML disc that may store as much as 3.2GB.

2GB NOT GOOD ENOUGH FOR YOU?

ML technology is based on an 8-bit grayscale system that doesn't require any significant reengineering of existing optical-drive technology. This naturally leads us to ask: How high will capacities go? Pretty high, it seems. By integrating the right chips into DVD recorders, increasing color depths, and further tweaking the media, TDK hopes to hit 50GB per DVD disc side within the next three years.

DVD+RW

CONTINUED...

▲ (continued from p43)

+RW media that's being used for data storage. And +RW media sports a much higher wobble-groove frequency than -RW media, thus generating (according to HP, anyway) much more accurate timing information and "true" lossless linking of data blocks. The +RW folks claim that this gives them an edge over -RW in compatibility with DVD-ROM and set-top DVD-Video players. Pioneer pooh-poohs this claim and says that the frequency of the wobble groove has nothing to do with the end result—that is, the ability to perform incremental write sessions of 32KB or more, an assertion that certainly conforms to our experiences in the unforgiving environment of our Lab.

Finally, +RW media technically departs from -RW media in that the area of the disc containing copyright, region encoding, and encryption information is physically accessible to the drive's writing mechanism. But the ability to write to this area will be disabled in firmware, at least in drives offered to the general public (namely, us).

Of course, DVD+RW has been notorious as "vaporware"—promised products have failed to materialize in the three years since the spec was first announced. However, the recent debut of DVD-R and DVD-RW kick-started the DVD+RW camp into action, and it appears that DVD+RW products are finally ready to emerge.

Philips and Thomson Consumer Electronics (RCA in the U.S.) have announced their intention to release +RW products for PCs and home DVD recorders by the end of the year. Dell has joined the DVD+RW Alliance and intends to incorporate +RW drives in PCs by the end of the year as well. But we expect the debut of the affordable +RW will begin with Hewlett-Packard, which has announced the release of an internal 4x writer that will show up in HP Pavilion machines. The release is slated to be "in time for Windows XP," but don't be surprised by a delay. HP expects to follow up the debut with stand-alone drives that will retail for under $600; look for those later in the fall. There's been considerable yapping among other manufacturers about releasing similar drives, including set-top PVR (personal video recorder) models, but due dates are vague—as they have been for three years now. In other words, don't hold your breath.

CAN YOU HACK IT?

Though the feature will be disabled in firmware, +RW drives are physically able to write to the content-protection area of DVD-Video discs—a delicious challenge to hardware hackers (not to mention movie pirates). But executing the hack will be harder than it sounds. Most commercial movie discs use a dual-layer format and, during playback, switch the laser's focus from the upper layer to the lower layer about halfway through the disc. No recordable DVD device supports writing to this format, so not only will you get just half of *Titanic*, it won't even be the good half.

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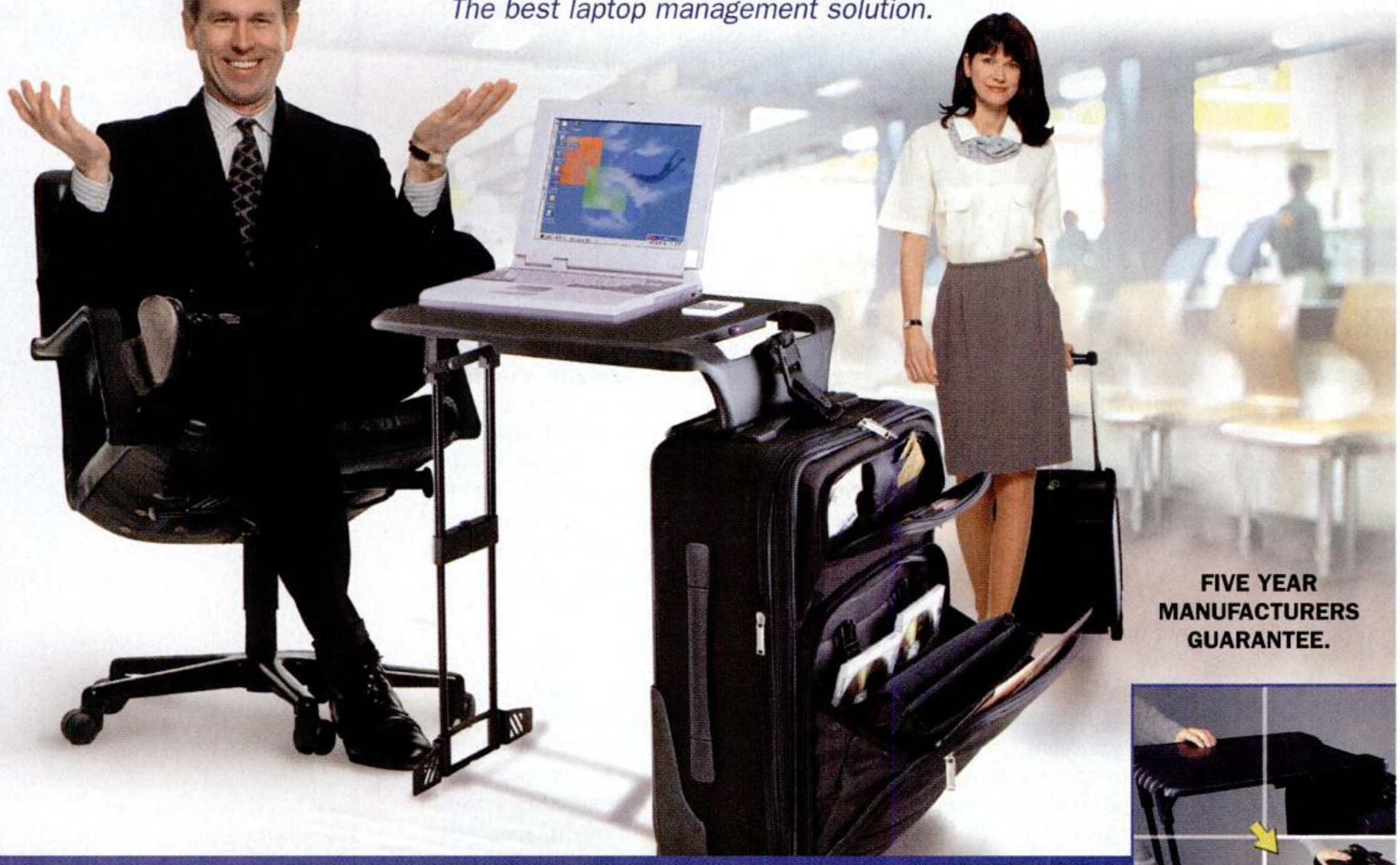

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THE UPSHOT

Sony and TDK both readily admit that the Double Density and MultiLevel technologies are intended to function as "bridge" formats until recordable DVD becomes ubiquitous. But we're skeptical about Double Density drives overall. With their limited capacity and depressing rollback to 12x writing speeds, we're not convinced they have the staying power they'll need for what might be a long wait. TDK, on the other hand, might be a little *too* modest about ML technology; it's one of those simple, easy-to-implement ideas that will have other companies dumping executives for not thinking of it sooner. Not only does ML have the capacity for further expansion by simply increasing the grayscale levels, but it can also be combined with any other optical technology by simply dropping a single chip into the works. This concept hasn't been lost on Plextor, which has already made plans to produce a DVD-recordable with integrated ML technology in 2002. Think about it: DVD's current 4.7GB capacity instantly tripled, for a total of up to 15GB per disc side. *Whoa.*

Things aren't quite so clear in the recordable DVD arena. DVD-RW certainly had a long head start over DVD+RW, and DVD+RW manufacturers generated a lot of ill will by putting off the technology's debut ad infinitum. Unfortunately for the DVD-RW folks, steep drive prices have hindered consumer adoption, so the spec hasn't accumulated the following it needs to ward off the competition. You'll hear hoots and catcalls from the +RW camp claiming that only *their* technology provides "true lossless linking" and "full compatibility" with set-top DVD players. But we've had no problems using -RW and have yet to find a set-top player that's been flummoxed by our homemade discs.

Nonetheless, DVD+RW is gaining tremendous momentum. With the addition of CAV writing to DVD+RW drives—and the faster and more efficient data access it provides—+RW really has a leg up on -RW when it comes to data storage. We predict that DVD-RW will remain a technically sound but second-tier technology, while DVD+RW will match, and possibly overtake, DVD-RW in PC configurations and become the format of choice in next-generation set-top personal video recorders.

Like taxes and political scandal, competing standards are a fact of life. They have to be dealt with, but it doesn't mean that nothing good will come of the spec wars. In fact, the hot and heavy competition is keeping prices down to earth, and, as a result, the options you'll see this year in CD and DVD recordables are among the most consumer-friendly and affordable innovations in PC history. ■

Want More Capacity? You'll Need a Blue 'Laser'

Today's CD and DVD players employ red lasers to read optical media, but Sony, Pioneer, Hewlett-Packard, and some other big names are racing to adopt and mass-produce blue lasers for use in tomorrow's optical players. Red lasers have a wavelength of over 630 nanometers, while blue lasers offer a wavelength of only 414 nanometers. As a result, blue lasers will be able to locate and address much smaller pits on the surface of optical media. And more pits mean larger capacities—up to four times larger than the current technology, and possibly as much as 10 times larger if the laser can be focused even more.

Once the price for the optical component hits about $20, we may start seeing consumer and PC products integrating the blue laser into their systems. The technology will also improve the resolution of projection displays, print technology, and spectrography.

OPTICAL DRIVE FEATURES PRIMER

How many times have you complained about linking errors resulting from a zone-based recording speed modulation? Yeah, that's what we thought. Yet descriptions of the latest optical drives loudly boast such inscrutable capabilities. As optical drive manufacturers bump up against the speed limit for media burning, they're being forced to equip drives with weird new features designed to mitigate the errors that occur when a disc is spinning in excess of 8000rpm. But what exactly do these "features" really do? Here's a rundown of the major technologies that help make high-speed burning possible.

- Sanyo's **FlexSS-BP**, also known as **JustSpeed** from Ricoh and a component of Yamaha's **SafeBurn** technology, scans the surface of the media inserted into a drive and assesses the top speed at which the media is able to record. Unlike JustSpeed, however, FlexSS-BP and SafeBurn continually check the surface of the disc throughout the writing process and alter the recording speed if necessary.
- **Zone CLV**, another brainchild of Sanyo, divides the surface of the disc into three discrete zones. Zone 1, closest to the inner ring of the disc, records at 16x; Zone 2 records at 20x; Zone 3, around the outer rings, records at the full 24x capacity of the drive. But between each Zone, the laser must pause briefly while the drive shifts to the higher gear. This technique was developed because trying to achieve 24x write speeds across the entire span of the disc would require rotation speeds so high, CDs burned at those rates would be riddled with errors.
- Yamaha's **Partial CAV** takes a smoother approach to the same operation, beginning at 12x writing at the center of the disc and ramping speeds up smoothly as the drive progresses to the outer circumference. In theory, this technology doesn't need to pause writing as the drive shifts into high gear. This means fewer linking blocks and more compatibility with home audio equipment. In practice, however, the difference appears to be negligible.

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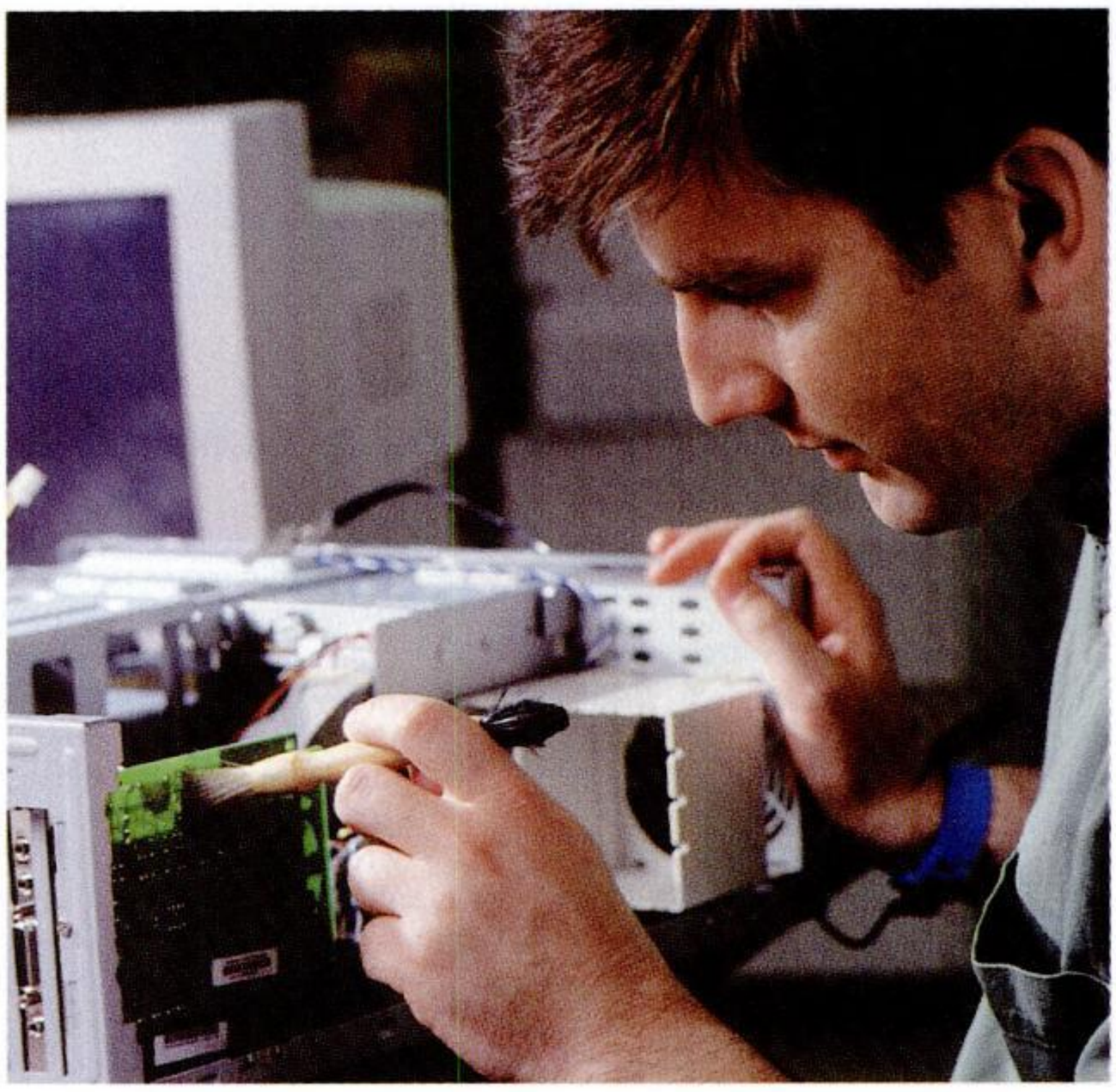

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MP3 SURVIVAL GUIDE

A LOOK AT NEXT-GEN NAPSTERS... OR WHERE'S A FILE HOUND TO TURN?

Napster is scrambling for relevancy and the MP3 format is on its last legs—but nothing can stop the digital music juggernaut. Here's everything you need to know about _Napster_ alternatives and MP3Pro, the chosen successor to the MP3 codec throne.

by **KRISTEN SALVATORE**

SAY BYE-BYE TO EVERYONE'S FAVORITE MUSIC-STEALING SOFTWARE—the latest version of *Napster* comes with "fingerprint technology" that's designed to thwart the trading of copyrighted material. A pay-for-service version of *Napster* is expected within the next few months, but by that time, cunning digital music fanatics will have moved on to other peer-to-peer file-transfer apps that actually work (and some that let you trade a lot more than just music files).

Though *Napster* is no more, there are more than 100 other peer-to-peer file-sharing programs available. Some are similar to *Napster* in that file requests are funneled through a centralized server. Others are *Gnutella* clones—file requests are truly peer-to-peer (no centralized server is involved), and searches are conducted within the *Gnutella* network. Still others work like *Gnutella*, but don't troll the *Gnutella* network.

In search of the quintessential *Napster* replacement, we tested the most popular apps in all three categories, and landed on the five featured in this article. Any worthy file-sharing client must be easy to use, allow resumable downloads, and report the bitrate and file size of every media file. And, of course, the app's file-trading community must offer a wide variety of downloadable music. To test for variety, we jumped on a DSL connection and searched between 6 p.m. and 9 p.m. PST for the following files:

- **"Goodbye Earl," Dixie Chicks**
  (we're not huge on country music, but the song is a crack-up)
- **"The Lady Is a Tramp," Buddy Greco**
  (a lesser-known version of the Sinatra classic)
- **"King Tut," Steve Martin**
  (a search for this song could also return video files)
- **"Let Me Blow Ya Mind," Eve with Gwen Stefani**
  (a current top-40 tune)
- **"Smalltown England," New Model Army**
  (obscure classic punk, and a favorite of our editor-in-chief)

Truth be told, we didn't expect any one service to hook us up with all these songs (though two did), and for the best results, we advocate using multiple programs simultaneously. We've included each of the programs on this month's Maximum CD, but you can also find them at the web sites listed with each description.

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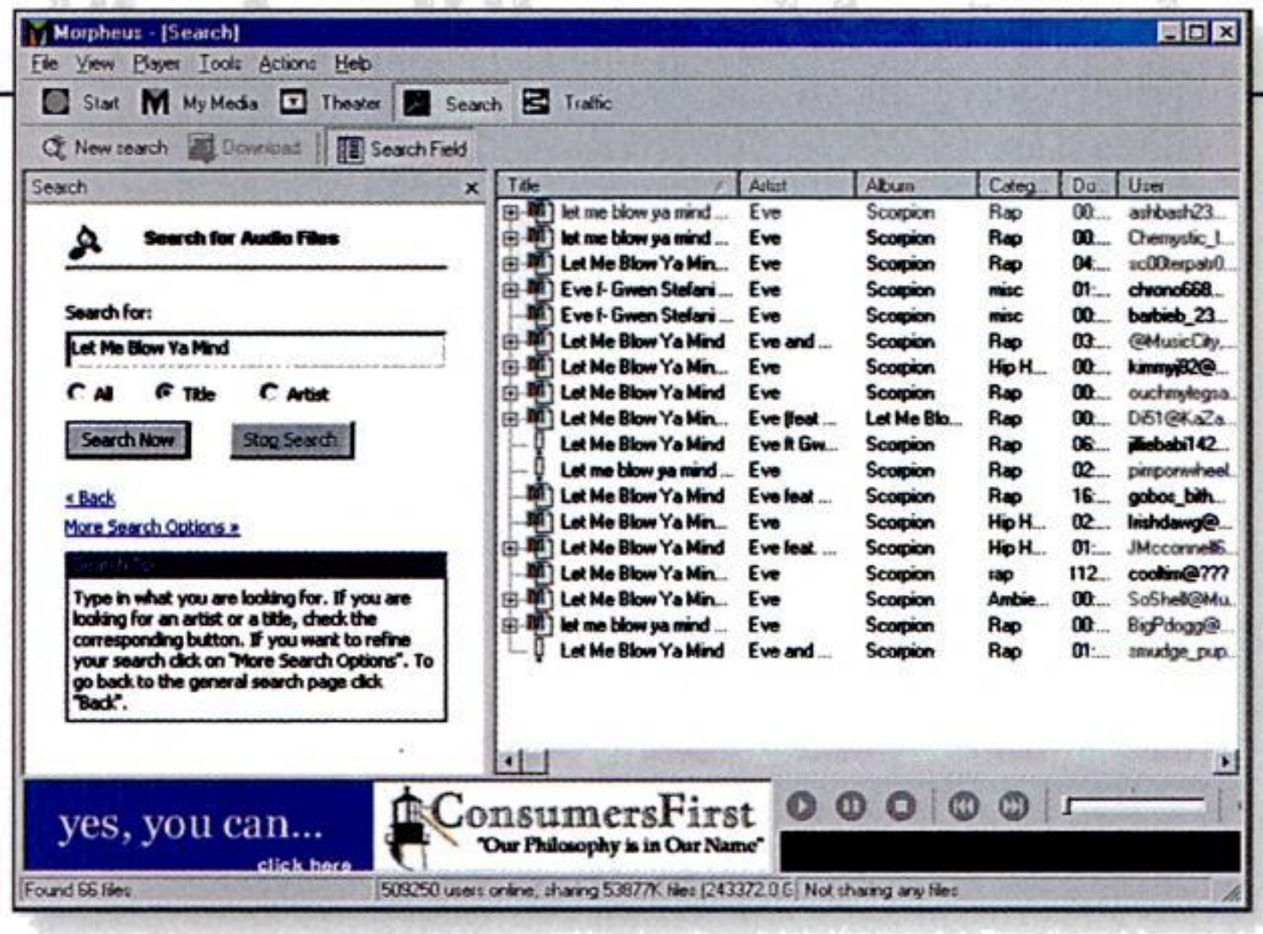
Morpheus - [Search]
File View Player Tools Actions Help
Start My Media Theater Search Traffic
New search Download Search Field
Search
Search for Audio Files
Search for:
Let Me Blow Ya Mind
All Title Artist
Search Now Stop Search
« Back
More Search Options »
Type in what you are looking for. If you are looking for an artist or a title, check the corresponding button. If you want to refine your search click on "More Search Options". To go back to the general search page click "Back".
Title Artist Album Categ... Do... User
let me blow ya mind ... Eve Scorpion Rap 00:... ashbash23...
let me blow ya mind ... Eve Scorpion Rap 00:... Chemystic_1...
Let Me Blow Ya Min... Eve Scorpion Rap 04:... sc00terpatr0...
Eve f- Gwen Stefani ... Eve Scorpion misc 01:... chrono668...
Eve f- Gwen Stefani ... Eve Scorpion misc 00:... barbieb_23...
Let Me Blow Ya Mind Eve and ... Scorpion Rap 03:... @MusicCity...
Let Me Blow Ya Min... Eve Scorpion Hip H... 00:... kimmyj82@...
Let Me Blow Ya Mind Eve Scorpion Rap 00:... ouchmylegsa...
Let Me Blow Ya Min... Eve (feat ... Let Me Blo... Rap 00:... DI51@KaZa...
Let Me Blow Ya Mind Eve ft Gw... Scorpion Rap 06:... jjliebabi142...
Let me blow ya mind ... Eve Scorpion Rap 02:... pimponwheel...
Let Me Blow Ya Mind Eve feat ... Scorpion Rap 16:... gobos_bith...
Let Me Blow Ya Min... Eve Scorpion Hip H... 02:... Irishdawg@...
Let Me Blow Ya Mind Eve feat ... Scorpion Hip H... 01:... JMcconnell6...
Let Me Blow Ya Min... Eve Scorpion rap 112... coollm@???
Let Me Blow Ya Min... Eve Scorpion Ambie... 00:... SoShell@Mu...
let me blow ya mind ... Eve Scorpion Rap 00:... BigPdogg@...
Let Me Blow Ya Mind Eve and ... Scorpion Rap 01:... smudge_pup...
yes, you can... click here
ConsumersFirst "Our Philosophy is in Our Name"
Found 66 files
509250 users online, sharing 53877K files [243372.0 G] Not sharing any files

KaZaA/Morpheus

www.kazaa.com / www.musiccity.com

These peer-to-peer file-sharing applications function without a central server, but they're not *Gnutella* wannabes. The major difference? Not every computer in the *KaZaA* or *Morpheus* networks acts as a server. Instead, people with especially powerful connections and faster computers are selected to act as "SuperNodes," i.e., local search hubs that field requests from all of the (ostensibly slower) "clients" in their neighborhood. Whether or not your machine is acting as a SuperNode, you'll never know—if your config meets the right criteria, your machine is automatically appointed. The beauty of SuperNodes is twofold: Slower rigs can't bog down the network (which often happens in a *Gnutella*-like organization, since any machine, fast or slow, is forced to act as a server), and there's no single server or organization that a group like, say, the RIAA can go after for facilitating the trading of copyrighted material.

According to Darrell Smith, CTO of MusicCity (the company that runs *Morpheus*), *KaZaA* and *Morpheus* are two different programs with the same underlying network technology. Though they're two separate networks, a search conducted on one is also conducted on the other—with one exception. *Morpheus* supports audio files at bitrates up to 320Kbps; *KaZaA* files max out at 128Kbps. A *Morpheus* search will show all relevant files at all bitrates; a *KaZaA* search won't include any results above 128Kbps. And installing both programs at the same time often causes Registry errors.

Still, both programs beat the dungarees off *Napster* in terms of ease-of-use and relevant search results. Plus, *KaZaA* and *Morpheus* will search for more than just audio—video, images, and text files are all up for grabs. Our only real gripe is that neither app seems to have a terribly diverse user base: Songs by the Dixie Chicks and Eve were easy to locate, but our other files were much tougher to get ahold of. "Smalltown England" never showed up, and though we found other Buddy Greco tunes, the one we wanted eluded us.

Morpheus and *KaZaA* both offer details on file sizes and bitrates, and search results are accompanied by estimated download times that are relatively accurate. We liked the option to find additional files from the same artist, as well as the ability to resume downloads that had been aborted. And whatever search algorithms these programs are using should be bottled and sold—they're intuitive to such a degree that just about every result returned is relevant to your initial search.

But our favorite *KaZaA*/*Morpheus* feature is "intelligent downloading." If the software determines that downloading a single file from several sources will reduce your overall download time, it will do so. For example, the software might grab the first part of the file from a computer in Sweden, the second part from a computer in Japan, and so on. In theory, this means that someone with a DSL modem could simultaneously download from five dial-up users, resulting in five times the download speed he'd get if he were stealing music from a single dial-up connection.

iMesh

www.imesh.com

You can perform a search for a file simply by visiting *iMesh*'s web site, but in order to download the file from another *iMesh* user, you must download the *iMesh* desktop application. We included *iMesh* in this article because we've seen mention of it in quite a few other news sources, but despite its purported popularity, *iMesh* doesn't appear to have a huge user base. In fact, at one point, a search for "Let Me Blow Ya Mind" yielded no matches, unlike the 100-plus matches the search prompted from every other program here. And a little ferreting through the *iMesh* site eventually yielded the "Important Notice!" that the RIAA has ordered the company to disable downloads of copyrighted material. Sound familiar?

In fact, *iMesh* does offer some improvements to the *Napster* model. Like *KaZaA*/*Morpheus* and *LimeWire*, *iMesh* will search for music, movies, images, and—according to its web site—school assignments. If you log off in the midst of downloading a file, the partial download is saved and resumed from the same place when you next connect. Like *KaZaA*/*Morpheus*, *iMesh* can download the same file from multiple users simultaneously, and if you're downloading a file from someone who logs off in the middle of your download, *iMesh* automatically "hops" to another user who has the file in order to complete the download.

The results of an *iMesh* search include details on the sizes of available files, but nothing on bitrates or the connection speeds of those hosting the files.

Protected material

LimeWire
www.limewire.com

This *Gnutella* clone will search the *Gnutella* network for audio, video, documents, images, or programs, but our experience taught us to specify. Searching for "any type" usually yielded no results, while specifying "audio" immediately located every file on our list—including "Smalltown England" (though just a single user on the network had this song). Our other searches yielded anywhere from 40 to 150 results each.

LimeWire generates results similar to those you'd get from a *Napster* search—it located anything remotely relevant, so searching for "The Lady Is a Tramp" returned an avalanche of Sinatra songs (though we did eventually locate the version we were looking for). *LimeWire* does, however, include some interesting features, such as the option to monitor incoming searches. This looks like a running list of all the things people are currently searching for, and if you can move fast enough (the list is scrolling at approximately the speed of light), you can click on a search and *LimeWire* will perform the same one for you. You can also perform simultaneous searches—up to six at once.

We'd have been a little happier with *LimeWire* if our search results had included some of the details we're used to getting from *Napster*—the most notable absences are bitrate information and connection speeds. Instead, users' connections are rated with one to six stars, which looks nice but really doesn't mean much to people accustomed to bandwidth specs. *LimeWire* does allow you to force the resumption of downloads, and allows you to adjust the amount of bandwidth you devote to uploads. It's hardly an improvement over *Napster* or any other file-sharing program, but *LimeWire* is definitely a no-muss, no-fuss way to harness the power of *Gnutella* networking.

audiogalaxy
Music Search
go
— Jump To —
go
satellite
Satellite Status
0 new - 0 transferring - 3 processing - 0 busy - 1 offline
Requested Songs
Status Remove Date Avail Artist - Song
processing 07/19 dixie chix - Goodbye Earl
processing 07/19 dixie chics - goodbye earl
processing 07/09 new model army - smalltown england
offline 06/27 the floaters - float on
Remove Selected
KEY: Play This song is on your hard drive. Click here to listen to it now with your default mp3 player
expand
Questions? Read the Satellite FAQ

AudioGalaxy
www.audiogalaxy.com

Navigating *AudioGalaxy* is a little tough to get used to because it doesn't look like... well, because it doesn't look like *Napster*. This isn't to say that all file-sharing services should look alike, but simply to note that if you download *AudioGalaxy* expecting the user interface of our old friend, you'll be put off at first. Firing up the *AudioGalaxy Satellite* program sends you to the *AudioGalaxy* web site, where you enter a request into the search field and are presented with a list of exact and not-so-exact matches (for example, if the search algorithm can't find the specific song you typed in, it might report other songs by the same artist). You choose the song you want to download and it's added to your "request list." If you have an always-on connection, simply add songs to your request list, then go about your business while *AudioGalaxy* searches for your requested tunes. Anytime another *AudioGalaxy* user who has that song logs on, the program automatically downloads it for you.

The drawback here is that if you want a song immediately, you may be out of luck. On the other hand, we found all the songs we searched for. It took two days to ferret them all out, but we did eventually find them. Effective? Yes. Instantly gratifying? Not so much.

Unlike the other service we looked at, *AudioGalaxy* only facilitates searches for music—no images or movies here. In fact, *AudioGalaxy* actually describes itself as a service that provides musicians with free space to post their music and to "get the exposure they've been craving." There's no mention of *AudioGalaxy*'s utility as a mass file-sharing hub.

AudioGalaxy includes some features we didn't see elsewhere, such as the option to search within a genre, as well as a series of "clubs" whose members are specifically devoted to sharing music of particular genres. We have just one major gripe with the service: Every time we were propelled into the *AudioGalaxy* web site, *Internet Explorer*'s "opening page" readout clearly displayed both our *AudioGalaxy* username and password. This leads us to question the overall privacy of the service.

What is Ogg Vorbis?

Contrary to popular belief, MP3 is not an open-source format. If you create an MP3 encoder, you're supposed to pay royalties to the good people at Fraunhofer, on the order of $25 per unit. If you host a web site that distributes MP3 files, you're supposed to pay them $.01 per song, or 1 percent of the selling price. This doesn't so much affect individuals, but if you're engaging in any MP3-related product development or business transactions, be prepared to pay up—or consider switching to Ogg Vorbis, a patent-free and royalty-free compression format created by a random team of programmers.

In June of this year, Vorbis developers put forth what they've called an official "release candidate" version of Vorbis (available at **www.vorbis.org**). No hardware players yet support the codec, but *Sonique*, *Winamp*, and *Freeamp* all play Vorbis files.

Vorbis fans pimp the format as the only way for small businesses to afford a streaming audio solution without having to pay licensing fees. Vorbis developers say their format offers smaller file sizes of superior quality compared to MP3. (Ogg Vorbis files can be fixed or variable bitrate up to 128Kbps.) Though MP3 is still far more widely known and used than any other compression scheme, a troll through various newsgroups and forums shows that Vorbis appears to be garnering more support every day. An official encoder is set for release any day, and we certainly plan to check it out. Keep your eyes on this emerging format.

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Format Wars

MP3PRO: BETTER SOUND AND SMALLER FILE SIZES— BUT IS IT CROSS-COMPATIBLE?

BILLED BY ITS CREATORS AS THE "NEXT generation of the world's most popular audio format," MP3Pro is a new compression scheme from Fraunhofer and Thomson Multimedia, creators of the MP3 codec. According to a press release from Thomson, MP3Pro was expressly created to defeat the growing list of competing compression standards that offer better sound quality and smaller file sizes than MP3 (the current roll call includes WMA, MP+, and the open-source Ogg Vorbis; see sidebars for more details on MP+ and Vorbis). In its press release, Thomson states that the leaner, better-sounding MP3Pro format is backward- and forward-compatible with the MP3 spec, but our testing didn't agree.

To improve sound quality, the MP3Pro encoder splits audio recordings into two parts. One part—the low-frequency band information—is encoded as a regular MP3 stream. The other part encodes the high-frequency information that old-school MP3 encoders always ignore. If you play an MP3Pro file on an MP3 decoder, you'll still hear the file—you just won't hear the high-frequency stream that an MP3Pro decoder will play. Hardware devices will need to incorporate the MP3Pro decoder in order to play MP3Pro files, and Thomson is negotiating deals with several hardware companies to license the new codec, which would cost about $7.50 per device.

Supposedly, MP3Pro files offer 128Kbps sound quality at a 64Kbps encoding rate, which roughly translates to better-quality files that are half as large as MP3 files. If that size-to-quality ratio is true, MP3Pro is directly competing with Microsoft's WMA in terms of sound quality and file size. But unlike WMA files, MP3Pro files are not equipped with digital rights management (DRM) security measures. That's going to make the new format either less or more competitive than WMA, depending on who you're talking to. Some people believe that eschewing DRM will give MP3Pro an edge over WMA, because most users want to avoid anti-piracy mechanisms. But others believe that a format supporting copy protection is guaranteed greater success because it will garner support from record labels and the RIAA. Of course, DRM could be added to MP3Pro at any time in the future.

Whether or not it will achieve widespread acceptance remains to be seen, but MP3Pro has at least been greeted with healthy interest. One week after the new format was released, Thomson announced that more than 600,000 people had downloaded the new encoder. We at *Maximum PC* did the dirty, and you can, too by visiting **www.rca.com** (RCA is partnered with Thomson). Here's what we discovered:

- We can hardly believe it ourselves, but on a pair of high-quality, noise-canceling headphones (Sony model MDR-NC5), we could hear a difference between a song encoded at 128Kbps using the MP3 codec and the very same song encoded at 64Kbps using MP3Pro. With MP3Pro, highs were slightly crisper and bass sounds were slightly fuller—and file sizes were smaller. Zoinks! At least, this is what we discovered while listening to each format via Thomson's own software decoder. While testing files in Windows Media Player, the MP3Pro file sounded slightly worse than the MP3 file, with more muffle—but that's to be expected, since WMA doesn't contain an MP3Pro decoder.
- While comparing MP3Pro to WMA (using the Thomson decoder and Windows Media Player, respectively), a 64Kbps MP3Pro file was definitely louder than a 64Kbps WMA file, but differences in sound quality were negligible. Since the current MP3Pro encoder won't encode files at bitrates higher than 64Kbps, we'll have to wait and see how these codecs perform against one another with larger file sizes.
- We actually expected hardware-based MP3 players to make MP3Pro files sound worse instead of better, because these devices aren't equipped to play MP3Pro's high-frequency tracks. We were right. An MP3Pro file burned to a data CD did play on a CD/MP3 player, but compared to an MP3 file of the same song, the sound quality of the MP3Pro file was terrible—tinny, muffled, and quieter overall. Meanwhile, our solid-state player (the Nomad II MG) wouldn't let us upload the MP3Pro file, let alone play it. Backward-compatible? Not in all cases, as it turns out.

Whether MP3Pro is The Next Big Thing in the world of lossy audio compression remains to be seen. But if the original MP3 codec—and its high exchangeability/low security characteristics—is any indication, the Thomson/Fraunhofer folks may have just introduced a WMA killer. ■

What is MP+?

Developed by German student Andree Buschman in an effort to improve upon MP3 sound quality, this compression scheme is loosely based on the MPEG-2 standard. Like MP3Pro, MP+ splits sound into different frequency bands. All MP+ files are variable bitrate, which almost always results in better sound quality. MP+ encoders can reach frequencies of up to 22KHz, while most MP3 encoders cut off at 16KHz. Though 16KHz is a reasonable cutoff, MP+ supporters believe that all audible high-end frequencies should be addressed by the encoder.

Is MP+ worth checking out? If you're a real audiophile who's staying awake at night trying to figure out how to get better audio quality in smaller files, you should probably give it a whirl. A Winamp plugin is available, and you can download an encoder and decoder at **http://members.home.nl/scimitar/mpegplus**. Just be aware that the software lacks a GUI and is completely command-line driven. Considering the ubiquity of Fraunhofer/Thomson technologies, don't look for widespread MP+ support anytime soon.

Reproduced material

Ask the Doctor

Symptom → Diagnosis → Cure

Even the burliest of PCs comes down with a bug every now and then. That's when you need to call The Doctor and get a diagnosis that'll have you up and running in no time. Send your symptoms to: **doctor@maximumpc.com**. Unfortunately, The Doctor cannot personally respond to every individual letter.

DAEMON Tools

When I select a full install of a game from CD-ROM, I'm still required to have the disc in my CD-ROM drive in order to run the program. Is there a way I can install these programs on my hard drive without having to insert the disc each time I want to use them?

—Derwin Hooker

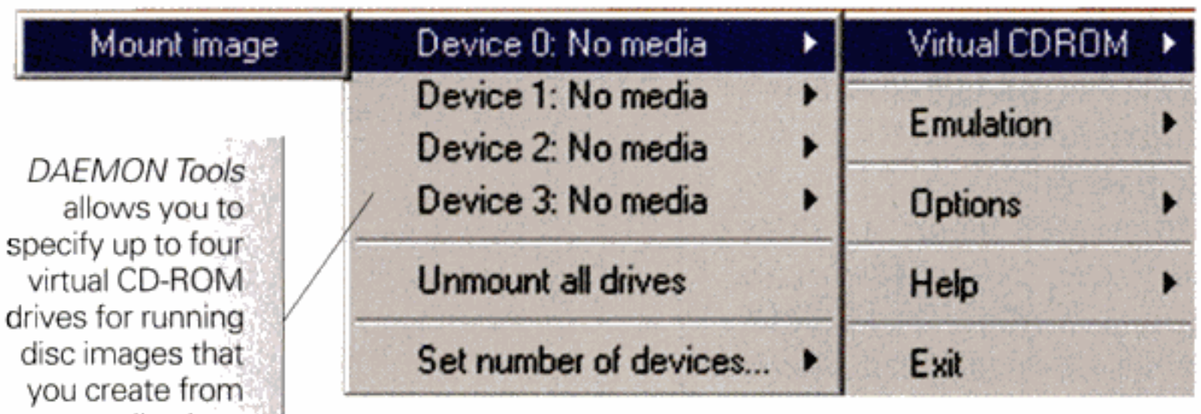
As you probably already know, you can't just copy all the files from most CD-ROMs and expect them to install and play from your hard drive. Back in the day, you wouldn't want them to—a 650MB disc used to be a mighty big slice of your hard drive—so the installation routines just copied the essential files to your drive and referred back to the CD for additional data as it was needed. But there's plenty of room on the average hard drive today, and it's commonplace for even a multi-CD game to dump more than a gig of textures and media files onto your hard drive, where they can be accessed much faster than from your CD-ROM. But these games still require that the original CD be in your optical drive for copy protection purposes, and if you've only got a single drive, all that disc swapping as you go from one program to another can be a big pain in the butt.

So what you need are two kinds of programs: one that can generate disc images from your CD-ROMs, and another that can mount the images to a virtual CD-ROM drive. Well, lucky for you, Derwin, The Doctor knows a site that has everything you need. Go to www.daemon-tools.com, and download a small utility called, not surprisingly, *DAEMON Tools*. The whole program is just over 200KB, is a snap to install, and is free for non-commercial use. After installation, you'll notice two new items in your Device Manager, the Virtual DAEMON SCSI Controller and the intriguing V386 Phantom CDROM, as well as a small red lightning-rod icon in your system tray. Don't forget to assign a fairly high drive letter to your new virtual drive in Device Manager so it won't later interfere with drive letter assignments for removable devices and such.

Now you'll need to make a disc image of your original CDs. *DAEMON Tools* is capable of mounting disc images created by *CloneCD*, *CDRWin*, and *Blindwrite*, as well as standard ISO images. You can get evaluation versions of all these programs for free using the links provided on the DAEMON Tools web site. After creating the image, just right-click the *DAEMON Tools* icon in the system tray, select Virtual CDROM> Device 0 > Mount Image and you'll get a dialog box asking you to point to where the disc image is.

As with any utility that tries to pull a fast one on Windows, *DAEMON Tools* might conflict with other drivers on your PC. If you experience mysterious lockups when using the program, check the support forums on the DAEMON Tools web site, and keep an eye out for program updates, which are frequent.

There is another option, as well. Check out the huge database of patches at www.gamecopyworld.com. You'll be able to download "No CD" patches and executables for just about any game out there. That is, for any game out there that you already own, naturally.



DAEMON Tools allows you to specify up to four virtual CD-ROM drives for running disc images that you create from applications such as *Nero* or *CloneCD*.

Capturing DVD Stills

I'd like to pull some images from a DVD running on my PC to use on a few of the pages of my personal web site. When I pause the movie, press the Print Screen button on my keyboard, minimize the DVD player, open up a program like *Photoshop*, and select Paste, all I get is a green box! Why does this happen? Is there any software available that will allow me to grab images from a DVD?

—Jason Middaugh

This happens because the Print Screen button captures the windowed image from your video RAM, which, as you have observed, doesn't contain any of the information coming from your DVD decoder. If your DVD decoder sent its signal through the video subsystem en route to your monitor, the full-motion video stream would hog up all the bandwidth, leaving little room for anything else. So most hardware and software DVD decoders use a much more efficient method called video overlay that sends the video stream directly into the VGA signal, bypassing your videocard altogether. That's why you can have your color mode set to 256 colors, yet still get true-color images from your DVD player window. This sly maneuver is accomplished using a technique called colorkey, which selectively replaces a specified pixel color (usually magenta or near-black, but in your case, green) with video content *after* it has passed through video RAM. So your software player fills its window with green pixels, which are then replaced with video from your decoder.

Most hardware and software DVD decoders send the video stream directly into the VGA signal, bypassing your videocard altogether.

In order to capture the video from your DVD, you need to disable hardware acceleration in the DVD player application you use (if the option is available), which will force the decoders to write to standard video memory. *PowerDVD* offers this option, which is very handy for taking a few shots while you watch your movie.

Sluggish Explorer Forms

I have been having recurring problems with *Internet Explorer 5.5*. When I'm using the browser, if there is a form to be filled out online, whether I use the Tab key

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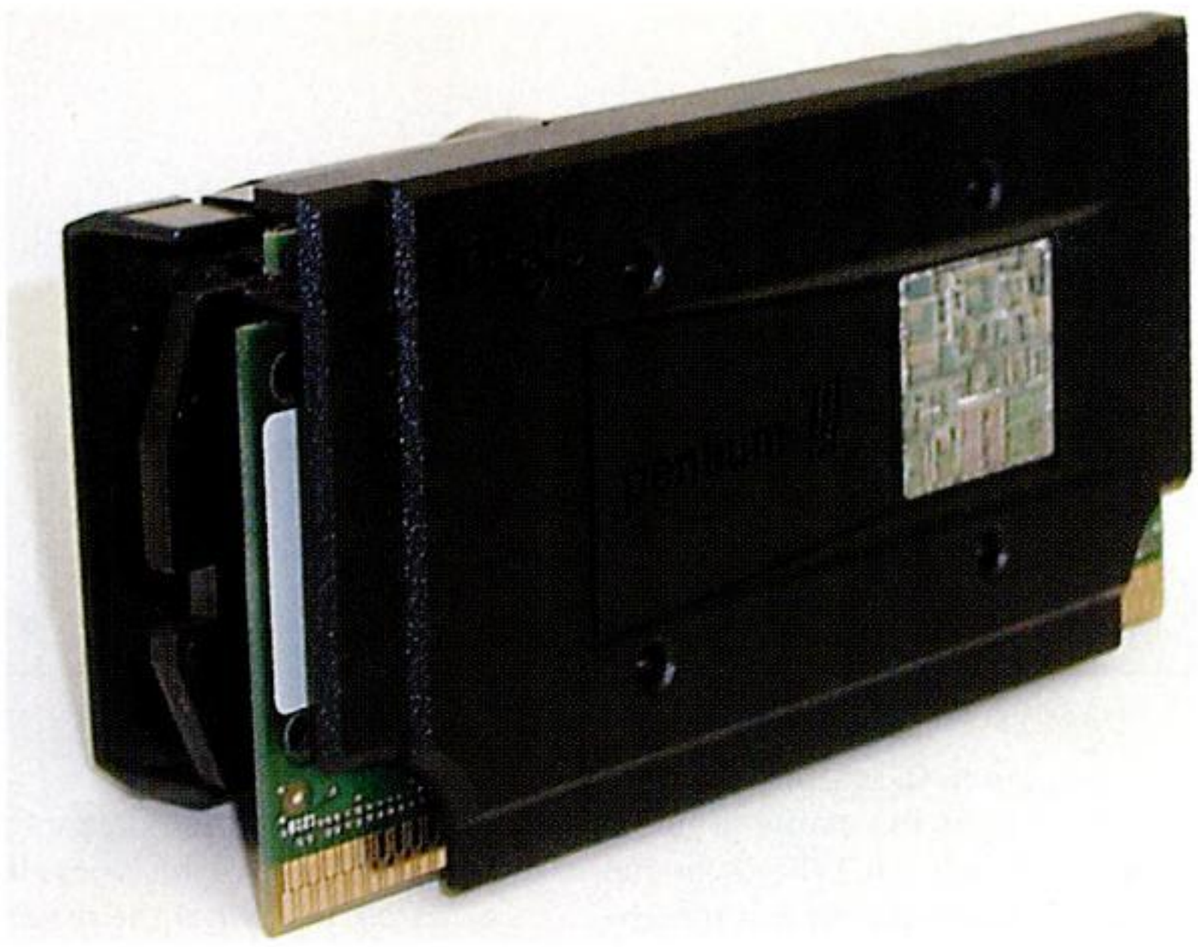

Hobbyists have been running dual Celeron machines for quite some time, even though Intel neither certified nor intended that CPU to be used in dual boards.

or the mouse, at least 15 seconds or so go by before the cursor appears in the next box. If I log in to a site, that takes a long time as well. It does not take a long time for sites or site pages to load up, just the things I mentioned. The odd thing is, though, when I use *Neoplanet* as my browser, which rides piggy-back on *Explorer*, things work pretty much as they should. Oh, yeah, my auto-complete doesn't work either, even though it's turned on. And finally, *Outlook Express* takes a minute and a half to launch. I have reformatted my computer to help get rid of these problems, as well as reinstalled all of the original system and software without reformatting. Though things seem to get back to normal for a little while, I am soon stuck with the same problem again.

I have the latest version and fixes for *IE 5.5*, I have a cable connection, and I'm running Win98. Can you make any sense out of this?

—Don Loe

Lots of people have cable connections and run Win98—nothing crazy about that. It sounds like your AutoComplete history information has become corrupted. The best place to start is by clearing your forms and passwords information. From *Internet Explorer*, go to Tools > Internet Options, select the Content tab, click AutoComplete, click Clear Forms and Clear Passwords, then select OK. This ought to eliminate the wait times when filling out forms, but of course, it will also eliminate your current AutoComplete history.

What's more worrisome, however, is that the problem keeps coming back. Somewhere, it would seem, you are frequenting a site that is killing your AutoComplete history and/or settings. You are going to have to be vigilant about noting when these problems occur. The Doctor wouldn't be surprised to find they occur after downloading rogue ActiveX controls or browser add-ons such as *Neoplanet*.

Does Pentium III Do SMP?

I have a Dual Slot 1 Tyan Tiger 133MB with two P-III 733MHz CPUs, 512MB RAM, and a Voodoo5 videocard. I recently came across an article online that identified certain Pentium IIIs as incompatible with an SMP environment. Unfortunately, my P-III 733MHz processors happen to be "non-SMP functional." I have noticed that *Photoshop* never uses my second processor, although it is installed in the Windows 2000 hardware. So is my second processor being utilized at all?

—D. Monteiro

You may have misinterpreted the article you read on the web. Both Intel and AMD go through great lengths to qualify CPUs for SMP use. When Intel says the CPUs are "not compatible," that means Intel does not *guarantee* it will work. This could mean the CPU did not pass 100 percent of the SMP tests Intel conducted on the CPU, or it could mean Intel did not test it for SMP. Either way, just because the CPU is not listed by Intel as SMP compliant, it doesn't mean it won't work. Hobbyists have been running dual Celeron machines for quite some time even though Intel neither certified nor intended that CPU to be used in dual boards. I wouldn't use *Photoshop* as a good gauge of multi-threading. Depending on the version you have, only a few of the filters and functions in the program use both processors. If Windows 2000 shows two CPUs and you can see both functioning in the Task Manager under the Performance tab (assuming that you haven't set the graph to combine both CPUs), your proc is probably functioning fine. The unfortunate truth is that too few of today's popular Windows applications are multi-threaded. Though that may change as Windows XP becomes the desktop OS of the future.

Mystery Wire

It all started earlier this week when my dad brought home an ancient Pentium 166 containing data he wanted my brother and me to recover. As I began to open the case, I realized that I would have to remove the front panel from the case to slide out the hard drive. That's when I saw *it*. It was a small black cord with a round end that was screwed into the metal of the case. I traced its route and saw that the cable that connected to the power button branched out into a hellish wire. This "Wire of Death," as I now refer to it, was directly connected to the power supply. I found another "Wire of Death" inside the power supply, also screwed

Cheap-o power supplies used to rely on grounding wires attached to your PC's case. Please put them back where you found them.

against the metal casing. What in God's name are these?! Are they some kind of deterrent to people who would otherwise operate on their computers with the power on? Are they some kind of device that the Russians planted to keep tabs on American technology? Does the government want me dead? Until these questions are answered, I have both "Wires of Death" unhooked and firmly wrapped in electrical tape. I'm scared!

—Kevin Davis

The first one is called a grounding wire, used alone or sometimes in tandem with another wire in cheap-o power supplies. The second is called a wiretap. Please put both back where you found them. ■

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How To...

A step-by-step guide to tweaking your PC experience

Be Your Own Technical Support

Every day when I come home to the house that I share with my Mom and brother Dickie, I hear Dickie ranting and raving from his "apartment" in the basement. He complains ad nauseum about the "numbskulls" and "dumbasses" that he has to help every day at work. Now if Dickie is to be believed, it seems that all the "morons" wouldn't need to bug him if they only took the time to learn how to help themselves. But they *don't* take the time, and, as a result, they get frantic, Dickie gets frustrated, and I get my ass beat when Dickie gets home and demands to know the whereabouts of his chicken pot pie.

Now, I didn't spend 18 months in a Guatemalan MSCE academy like Dickie did, but I can fix a computer. When I have a problem, I simply ask myself, "What would Dickie do?" and then quickly find my path. Dickie's not inherently more capable of solving PC problems; he just knows where to look on the Internet for answers. And after reading this article, you'll know how to use the Internet for tech support help as well.

BY NORBERT MATTHEWS

Dealing with the idiots in Marketing

According to Dickie, Joe Atkins in Marketing is the single greatest scourge on Earth. Whenever Joe has any sort of Windows error—be it a blue screen of death or a "disk not found" message—Joe rings the IT department and waits for help to arrive. What should Joe do instead? It's easy: He should check Microsoft's search site to learn more about his technical problem, rather than bugging my poor put-upon brother.

The MS search site at **www.microsoft.com/search** offers a plethora of options. You can either search the entire site or narrow a search to a particular section (e.g., Business Solutions, Product Information). The site also offers options for various search specifications that can result in a greater or smaller number of matches. For example:

- **Exact Phrase** – This search option returns only pages that have every word searched for, in the exact order the words were entered.
- **All Words** – Returns only pages that contain all of the words in a search, no matter the order.
- **Any Words** – Returns pages that match any of the words in a search.
- **Boolean Search** – Searches using a very specific set of phrasing rules: Use AND between two words that must be in a document; OR includes either of the words; NOT can be used to exclude a word. For example, a search for ***pie AND Simpsons NOT Bart*** would return pages that include the words "pie" and "Simpsons," but no pages that include the word "Bart." If a phrase is included within quotation marks, only documents that contain the exact phrase will be returned. Case sensitivity may or may not matter, depending on the search engine.

If you find yourself confronted

Dealing with the world's most destructive power losers

HEALING YOUR HARDWARE HEADACHES

So something about your computer isn't working, and you're certain it's not a software problem. You've rebooted your PC, checked to make sure that everything is plugged in properly, and you're still having problems. Now you need to isolate the offending piece of hardware.

Have you recently installed a new piece of hardware? If so, you know where to start your investigation. Remove the new hardware and see if that fixes the situation. If it does, you should look for help at the manufacturer's site; you might find a bug fix for the offending hardware. If, however, the removal doesn't fix your problem, check the Device Manager for any hardware conflicts (conflicts are represented by icons with red exclamation points or similar warning symbols). If no warning icons are present, you can try removing each component from your machine, one piece at a time. When the problem goes away, you've found the offending hardware.

Once you've isolated the troublemaker, grab the latest appropriate driver updates from either WinDrivers.com or the hardware manufacturer's web site, reinstall the hardware, and load the new drivers. If your hardware still isn't functioning, it's possible you've got a more esoteric problem on your hands. And if that's the case, read on.

TAKING YOUR SEARCH TO THE STREET

The great thing about the Internet is that it's populated by millions of people, and many of them are computer geeks—just like you. Indeed, the web can be a rich resource for help with a computer problem. The key is to use a search engine that scans millions of web pages and indexes keywords. We like Google.com because, in addition to searching web pages, Google searches Usenet, the granddaddy of all Internet message boards. If you have a piece of computer hardware made in the past 10 years, it's almost certainly mentioned someplace on either the web or Usenet—and a lot of those references include fixes to annoying problems.

When you're using Google, there are a few things to keep in mind. By default, Google only returns pages that match all the words in your query, but not necessarily the exact phrase you entered (***Simpson Bart*** and ***Bart***

Specialist

with a specific error message, you'd be wise to conduct a search using the Exact Phrase option in the Support & Knowledge Base section of the Microsoft site. If you have only a general knowledge of the problem, such as your Windows 98 machine crashing whenever you try to print from *Outlook*, you can search using All Words for ***Win98 Outlook crash print***. With any luck, you'll receive some relevant info.

Microsoft's site is an extremely valuable resource because the Knowledge Base has entries for many of the "errata" that cause Windows crashes, as well as instructions on how to resolve them.

SUSSING OUT SOFTWARE SOLUTIONS

Suppose that Microsoft's search function doesn't provide you with the answers you need. Where should you go next? If you're experiencing an error or blue-screen issue while using a specific program, the obvious alternative is to check the support pages of the developer that made the software. How do you find the web site for your software company? It's easy. Check the Help/About menu of the program to find the name of the software developer, then fire up Yahoo. While Yahoo isn't very good at doing keyword searches of the entire Internet, it's great for finding a specific company's web site, as well as other sites that are relevant to a company's products.

Once you're on a company's web site, it's likely you'll get even closer to the information you seek by going to **www.[companyname].com/support**. Most company sites follow this simple naming convention, which makes it easy for you to get started. First, check for a problem similar to yours in the FAQ (Frequently Asked Questions) section. More often than not, someone else has had the same problem as yours, and a solution has already been posted. If you don't have a typical problem, do a search of the site—just like you did at the Microsoft site—for answers. And whenever possible, update your software to the latest version, and install any bug patches available for free online.

FINDING OUT WHAT DICK KNOWS

Most of Dickie's knowledge comes from tapping the vast resources of the online community. If you have a problem, chances are there's a geek out there who can help you. I've caught Dickie surfing more than one of these sites late at night:

- **http://forums.maximumpc.com/maxcommport/start** The *Maximum PC* forums are chock-full of useful information and full of people willing to help with your problems, no matter what they are.
- **www.arstechnica.com** Ars Technica is a great place to find out how the innards of your PC work, so you can impress the numb-skulls at work. Be sure to check out the forums before you leave.
- **www.windrivers.com** Trying to find a driver for that Aureal soundcard? Check WinDrivers. It's got thousands of drivers on file free for the taking.
- **http://pcnineoneone.com** PC911 offers tech support to anyone who needs it and has a boisterous forum, too!
- **www.google.com/help/basics.html** Almost every search engine on the net has a "Helpful Hints" type section. Dickie likes Google, so I'll pimp it.

Simpson will get you the same pages). If you want to search for an exact phrase, you'll need to use quotation marks ("Bart Simpson"). If you'd like to search for one thing but not another, you can indicate that by putting a minus sign (also known as a hyphen) in front of the undesirable word (Simpsons –Bart).

When searching the net to find problems with hardware, start with the exact model number of the malfunctioning device. If you have an IRQ conflict with an Abit BH-6 motherboard in Windows ME, search for ***Abit BH-6 IRQ conflict ME***.

SIZING UP YOUR CPU

Don't get me wrong—Dickie hates "nimrods." He damns their nimroditude every day. But he has an even larger gripe with "power losers" who think they know what they're doing when it comes to CPU upgrading, overclocking, and cooling. The power losers are always bugging Dickie for technical information, when, according to Dickie, the data is freely available online.

Want to graduate from "power loser" to "power user"? Here's some advice: If your PC sports an Intel CPU, head to **http://developer.intel.com** and enter the SL-spec into the quick search field (the SL-spec number is printed on all Intel CPUs; for example, a 1.8GHz Pentium 4 is designated SL4WV). The resulting page should tell you all you need to know about your CPU, from proper voltages to temperature limits.

AMD users don't have it quite so easy. Because AMD stores its processor specs in PDF format, the search function on its site doesn't index that info. Fear not, however. You can go to **www.amd.com/products/cpg/athlon/techdocs** and download the specs for your particular processor.

I've learned from Dickie that power losers often want to know the fastest speed processor their motherboard can support. If you built your own system, you already know what mobo you have, but if you bought a pre-built system, chances are you have no idea what motherboard your system sports. Enter Mobocop, one of the features available at **www.motherboards.org**. It asks you a series of questions about your PC in order to ID the board it contains. Once you know what board you have, links at the site allow you to download manuals and BIOS updates. You'll soon be on your way to CPU upgrading heaven. And out of Dickie's direct line of fire. He doesn't like power losers. Doesn't like 'em at all. ■

In the Lab

A behind-the-scenes look at Maximum PC testing

The Convenience of Cloning

Hard-drive backups make for fair testing—and fair gaming

This fellow may look like Reviews Editor Rob Pratt, but it's actually an astonishingly lifelike clone.

We know what you think, but it isn't true. As soon as we get the latest and greatest systems into the Maximum PC Lab, we do *not* fire up our favorite games. That comes later. Instead, we first clone the hard drive, copying all of the data to a single backup file.

Every week, hard-drive clones save us hours of lab time that we'd otherwise have to spend fixing glitches and reinstalling Windows. Our system benchmarks have a way of clogging hard drives with gigabytes of test applications, and in extreme cases, fouling the Windows Registry. But if we've made a hard-drive clone before testing, we can address problems quickly and effectively by obliterating a machine's entire software build, then copying a clone of the original drive to the ailing test system.

To make a clone, all you need is a drive-imaging utility and some space on a second drive to store the cloned image. Both *Symantec Norton Ghost 2001* and *PowerQuest Drive Image 4.0 Pro* make cloning quick, easy, and reliable. Fast, too. Loading a basic 1.5GB clone on one of our test machines takes about 10 minutes.

Clones of Windows rigs typically don't run larger than 1.5GB, even with a handful of applications installed. The catch is that for clones to be really useful, you should have at least two partitions or two hard drives in your PC, and you should get into the habit of saving all of your critical applications and data (and all of your hard-drive clones) on the partition or drive that doesn't hold your workaday OS. For instance, if you have a single physical drive partitioned into C: and D: drives, install your OS on the C: drive and save everything you want to keep (including clones of the C: drive) on the D: drive.

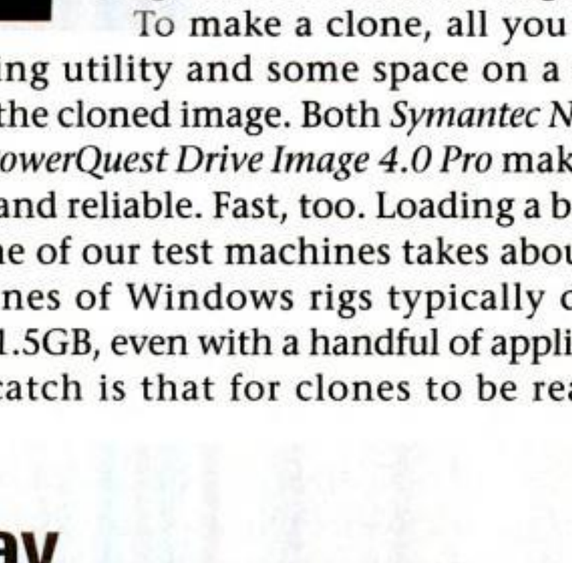
For my test machine in the Maximum PC Lab, I have several drive images—one for Windows ME, one for Windows 2000 Professional, and others for various OS and application combinations. I also have "blank" images, which have a "clean" copy of the OS; the only drivers in the build are for my test machine's motherboard. That way I can quickly load a relatively driver-free clone to use for hardware testing. It may not be fair to videocard makers, for example, if I test a new GeForce3 board on a system already contaminated with some other manufacturer's videocard drivers.

Here's the best part about using hard-drive clones: Once we're done benchmarking a system, we can play all the games we want, and PC makers never have to know about it. Right before the dreaded return-shipping time, we reload a clone of the original hard drive and pack up the system. When the delivery company returns it to the PC maker's loading dock, it has exactly the same hard-drive data that it originally came with.

—ROB PRATT, REVIEWS EDITOR

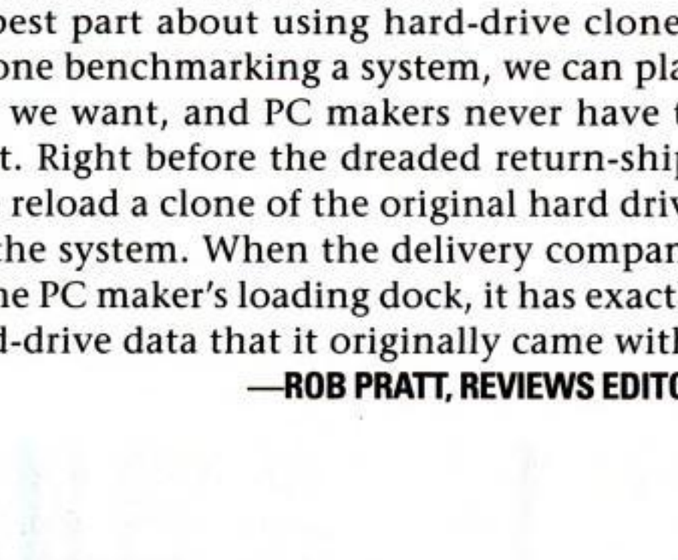
Plug-and-Play

A look inside the Maximum PC Lab shows the crew here to be a group of very conscientious individuals. Indeed, their passion for PCs does not overshadow their attention to safety. Take for example some of the anti-static accouterments that staffers don while conducting their various tests.



Kristen wears an anti-static leash for proper grounding.

Ed takes it a step further with a lovely powder-blue anti-static caftan.



But Gordon's ingenious anti-static measures certainly take the cake. (Do *not* try this at home.)

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I'd Like to Thank My IDE Controller . . .

Which DVD-ROM drive steals the show for PC theater systems?

When you're not kicking back with a DVD, Pioneer's DVD-115 has more to offer as a backup CD-ROM.

What? You don't watch DVD movies on your PC? Are you crazy? Think about it: The CRT monitor on your computer desk probably offers better image quality than most TVs, and you can assemble a full-on PC theater system for about the same price you'd pay for a set-top DVD player and Dolby Digital 5.1 speakers.

Plenty of PC hardware vendors now make soundcards and speakers that do Dolby Digital 5.1 easily and inexpensively. But the heart of a PC theater system is the DVD-ROM drive, and, until recently, it's been a one-drive show starring Pioneer's DVD 115. But, while reviewing the latest desktop PCs during the past few months, we've noticed there's a new DVD-ROM drive trying to steal the spotlight—Toshiba's SD-M1502.

The Toshiba drive first made an appearance in our zero-point test systems from HP. Half of the six new test systems came with the Pioneer drive, and half came with the Toshiba. Since then, we've also spotted the Toshiba DVD-ROM drive in a system from Polywell.

So which one has the most star power?

SCENE 1: DVD PERFORMANCE

The Toshiba could hardly remember its lines. An average drive rating of 4.3x made for an incredibly feeble data transfer performance. While DVD movies only play at 1x, the Toshiba's random and full-stroke access times of 122ms and 262ms, respectively, don't bode well for scene-scanning. This *is* a 16x drive, right?

Pioneer's DVD 115 comes glamorously billed as a 16x drive, but a modest 8.4x average adds a little tarnish to the tinsel. Random and full-stroke access times of 85ms and 181ms, however, showed that this drive can keep up with after-hours CD-ROM chores.

SCENE 2: NOISE OUTPUT

Watching a movie with a noisy drive can be just as annoying as getting beaned with popcorn at the theater. Although the Toshiba does emit a clearly audible hum, even at its worst, the white-noise whirring isn't terribly distracting. The drive's shell casing seems to dampen the sound when the drive mechanism throttles up.

If you have to sit next to the Pioneer drive during a movie, you'll probably want to call the manager. It's not that the drive is louder than the Toshiba, it's just that the high-frequency, dying-gerbil-like whine makes us cringe even when Leonardo DiCaprio isn't in the scene. You probably won't notice anything when watching a Michael Bay production, but this is definitely not the drive for the Merchant/ Ivory crowd.

SCENE 3: IMAGE QUALITY

Because both the Pioneer and Toshiba drives came in identical HP test-bed systems, we decided to see if the drives themselves had any effect on image quality in movies. After all, it's the quality of the MPEG-2 decoder—be it hardware or software—that determines visual quality, right? We popped in *Crouching Tiger, Hidden Dragon* and screened the nasty confrontation between Michelle Yeoh and Ziyi Zhang—and both drives returned identical images that were astoundingly smooth and artifact-free.

Both drives offer spectacular color (top, Pioneer) and clarity (bottom, Toshiba).

THE DECISION

And the Labby goes to... THE PIONEER DVD 115! Yes, it's louder than the Toshiba, but because DVD-ROM drives must also complete CD-ROM chores, we're wont to choose the fastest hardware.

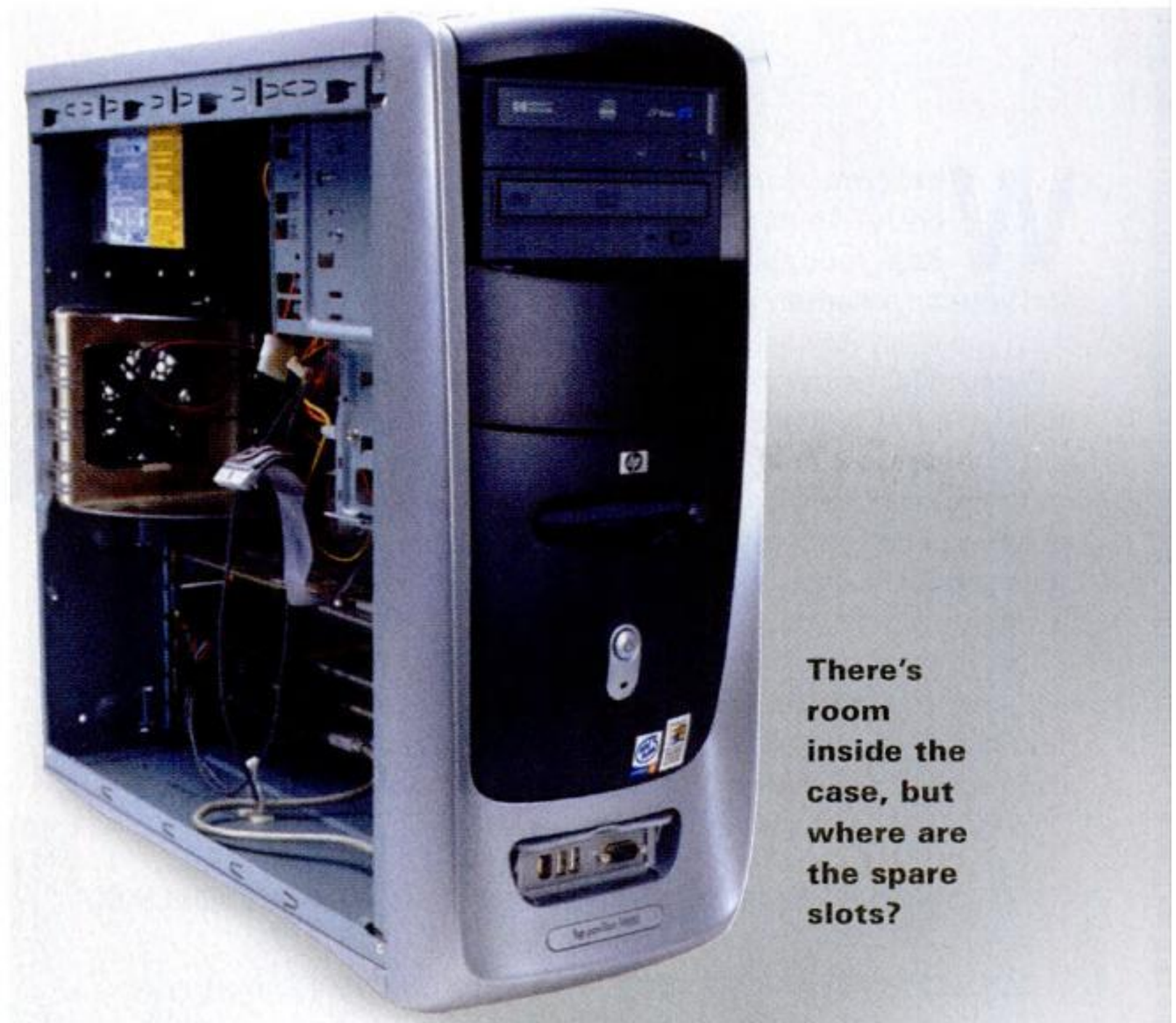
(Cue music, cue spotlights, cue long-winded speeches from marketing dweebs.)

—LOGAN DECKER

Protected material

HP Pavilion 9800 1.7 GHz

You can take this dependable rig to the dance—but she's no Carmen Electra



There's room inside the case, but where are the spare slots?

Benchmarking HP's latest Pavilion PC was like reuniting with a long-lost girlfriend. We were certainly familiar with the rig's sleek lines and identifying birthmarks—after all, we use Pentium 4-based Pavilions as our zero-point test-bed systems (see the benchmarking section at **www.maximumpc.com** for more information). HP's new 9800, however, comes with a 1.7GHz P4 (that's 300MHz faster than our zero-point rigs), a 64MB GeForce3 (which puts the test rigs' GeForce2 cards to shame), and a CD-RW drive to complement the standard Toshiba DVD-ROM drive. Our first impression? We thought we had just met a machine that we'd be proud to take home to meet the parents.

UNDER THE HOOD

THE BRAINS	
CPU	Intel Pentium 4 1.7GHz
RAM	256MB PC800 RDRAM DIMMs
I/O ports	Four USB, HP FireWire 3 port card, two serial, one parallel, PS/2 keyboard and mouse, one gameport
NETWORKING	
Modem	Smart Modular 90109
LAN	Ethernet PCI card
DISPLAY	
Videocard	Asus GeForce3 64MB DDR RAM
Display	Monitor available but not reviewed
Refresh@ max res	N/A
STORAGE	
Hard drive	60GB IBM Deskstar, 7200rpm
DVD-ROM	16x Toshiba DVD-ROM
CD/RW	HP CD-Writer Plus 12/8/32
SOUND	
Soundcard	Creative Labs Sound Blaster Live! 5.1
Speakers	Polk Audio 4.1 AMR150 system
MOUSE	
HP optical mouse	
BUNDLE	
Windows ME, *Microsoft Works, Microsoft Money, StudioDVD*	
BOOT: 34 sec.	**DOWN: 8 sec.**

But we soon discovered the 9800's irritating personality quirks. Despite boasting comparable hardware specs, the Pavilion couldn't keep pace with the 1.7GHz Ace Dreamedia machine we reviewed in July. The Pavilion 9800 hit a perfectly acceptable 53.9fps in *Quake III*, but the Dreamedia hit 58.3fps. Loading the latest nVidia reference drivers tacked on a mere frame to the 9800's *Quake III* score. In our *3DMark2001* test, the 9800 hit 15.4fps, compared to the Dreamedia's 16.2fps. And next to the Dreamedia's 191-second sprint in our audio-ripping test, the 9800's 287-second jog was quite a letdown.

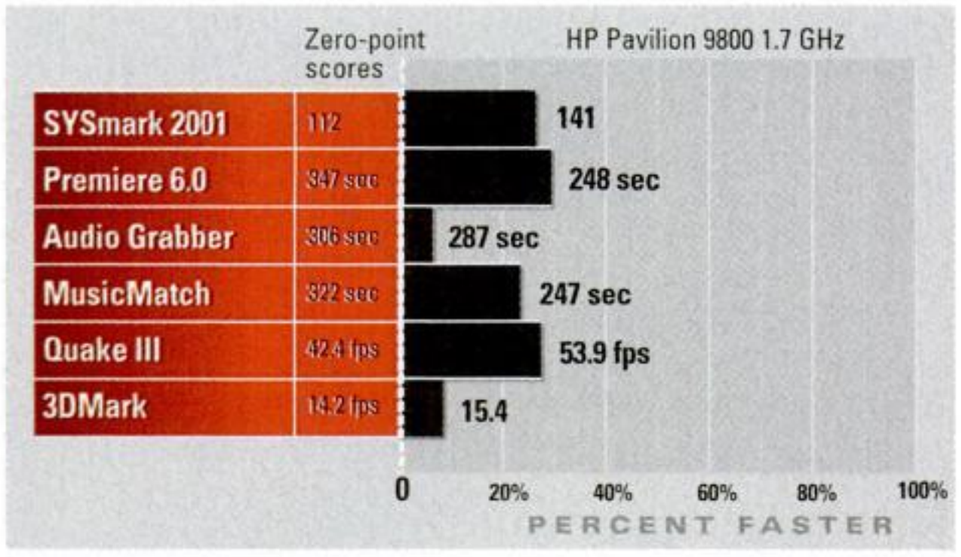
In our rigorous *Premiere* tests, the 9800 fared somewhat better, crunching our video footage into a DV file in 248 seconds; the Dreamedia was just eight seconds faster. But the Pavilion 9800 fell short of both the Dreamedia and Polywell's 1.4GHz Athlon box in our *SYSmark2001* benchmark, scoring a measly 141 (the Dreamedia hit 158, while the Poly hit 168).

Without a single spare DIMM slot and only one open PCI slot, the 9800 leaves little room for upgrades. Considering that Rambus memory prices are slowly dropping, it's a tragedy that all four DIMM slots are filled up with mere 64MB sticks. Factor in a 250W power supply that fails to address the needs of any serious PC nut, and you have a decidedly unfriendly upgrading situation. As for the Pavilion's case, it hasn't changed a bit since the day we first met it, though HP has improved functionality by adding a FireWire port to the front bezel.

Peripherals? A monitor is optional—so we opted to use our own. On the speaker front, HP sent us a Polk Audio 4.1 speaker system that's a far cry from the wailing wonder of Klipsch ProMedia. With an anemic 114 watts of power at their disposal, the Polkies gave us a flat farrago of break beats while playing a Fatboy Slim track.

The Pavilion 9800 is a classy dame, but just a bit too conservative for our wilder proclivities. So, if you simply want a dance partner to bring to the P4 cotillion, you've met your sweetheart. But if you're looking for a night of extreme PC passion, you'd do better to pursue a less conventional romance.

—EDWARD CHAMPION



Full benchmarking details at www.maximumpc.com/benchmarking/index.html

MAXIMUMPC VERDICT

Pavilion 9800 1.7GHz
HEWLETT PACKARD

WHAT WE LIKE

Smooth and fast Pentium 4 performance comes bundled with dependable components.

WHAT WE HATE

The benchmark scores don't compare to the best we've seen from comparable systems, and the rig's stock config is upgrading-antagonistic.

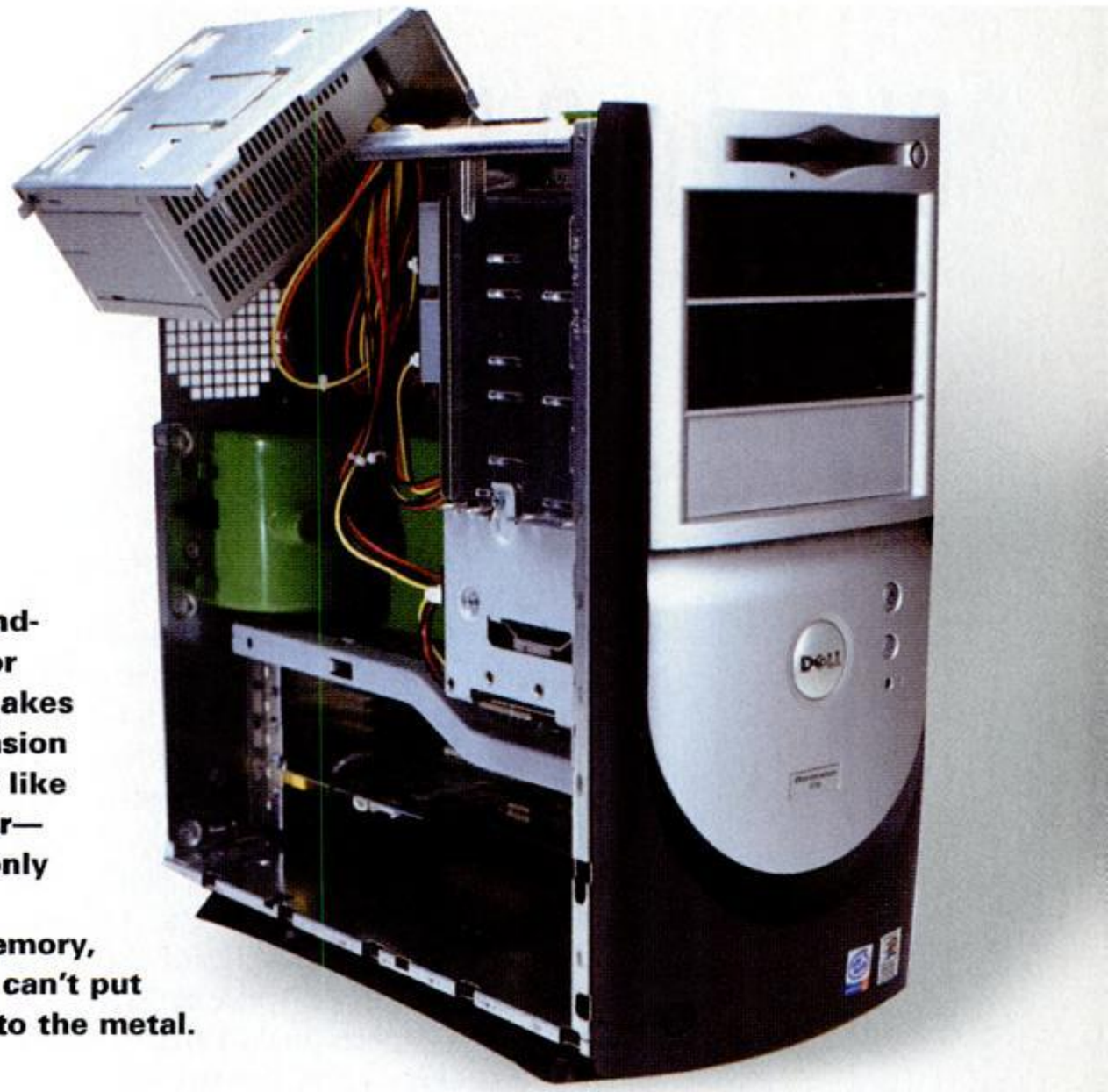
888.999.4747 | www.hp.com
$2,600

6

Copyrighted material

Dell Dimension 8100

Brother, can you spare a RIMM?



A black-and-silver color scheme makes the Dimension 8100 look like a sportster—but with only 128MB of system memory, you really can't put the pedal to the metal.

Dell's Dimension 8100 moves into the fast lane with a top-speed 1.7GHz Pentium 4 processor and a GeForce3 card to supercharge your 3D gaming. But sputtering performance from a lame configuration decision keeps this grand-prix contender from setting records or even finishing among the leaders.

Out of the box, the Dimension 8100 sparkles with a showroom polish. The standard black-and-silver Dell case along with the black, 17-inch Trinitron monitor look smart when trimmed with a set of Altec Lansing ADA885 digital 4.1 speakers. To break inside the case, you have to flip up side-panel covers, which in their silvery majesty are reminiscent of the winged doors on a DeLorean. Inside, the Dell comes with a basic selection of the latest and greatest hardware: a Turtle Beach Santa Cruz soundcard, a VisionTek GeForce3 card, a 60GB Maxtor DiamondMax Plus hard drive, and a pair of optical drives from NEC.

When we fired up the Dimension 8100 and took it for a test on our benchmark skid pad, the system delivered a slow ride. Its paltry *SYSmark2001* score of 134 was 6 percent slower than a similarly configured 1.7GHz P4 HP system that hit 144 (see facing page). In fact, the Dimension 8100 lagged behind other 1.7GHz P4 systems in most of our benchmarks, and for this we blame one simple factor: Dell skimped on memory. Instead of packing 256MB of Direct RDRAM into the mobo's four DIMM slots, Dell opted for only two 64MB DIMMs. Our tests show that Pentium 4 systems really only begin to shine when equipped with 256MB.

Just to test our memory theory, we upgraded the Dimension 8100 with an additional 128MB of Direct RDRAM. What we found made us holler "Surprise, surprise, surprise!" like Gomer Pyle. With 256MB of system memory, the Dimension 8100 hit 55.4fps in *Quake III*, which is right up there with the fastest P4 systems. On a second run of *SYSmark2001*, the extra memory proved its mettle again. With the added memory, the Dimension turned in a score of 144. That's not the best mark we've seen from a 1.7GHz P4 system, but it's respectable.

The Dimension 8100's "new media" peripherals are good, but not great. The 16x NEC CD-R/RW burner includes Ricoh's Just-Link buffer underrun-prevention technology, and the 16x NEC DVD-ROM drive works quite uneventfully (hey, no news is good news, right?). Together the two drives are fine for playback and disc-to-disc copying, but the burner is no Plextor 16x or Yamaha 20x. The Versajack on the Santa Cruz soundcard plugs right into the digital input on the Altec Lansing surround-sound speakers, which pump out rich and warm audio at low and moderate levels. They're fine at the volumes most people use for gaming and DVD playback, but they have an irritating midrange bark at high volumes, so they're not a good bet if you want your PC to double as a home stereo.

We have to take the world's largest PC maker to task for crippling a system that has the potential to challenge the best OEM rigs we've ever tested—and all because of a measly 128MB of RDRAM. What were the system engineers thinking? Another 128MB stick of memory wouldn't add much more than $100 to the bottom-line price and would ensure that Dell customers wouldn't be jealously eyeing the benchmark scores of other machines.

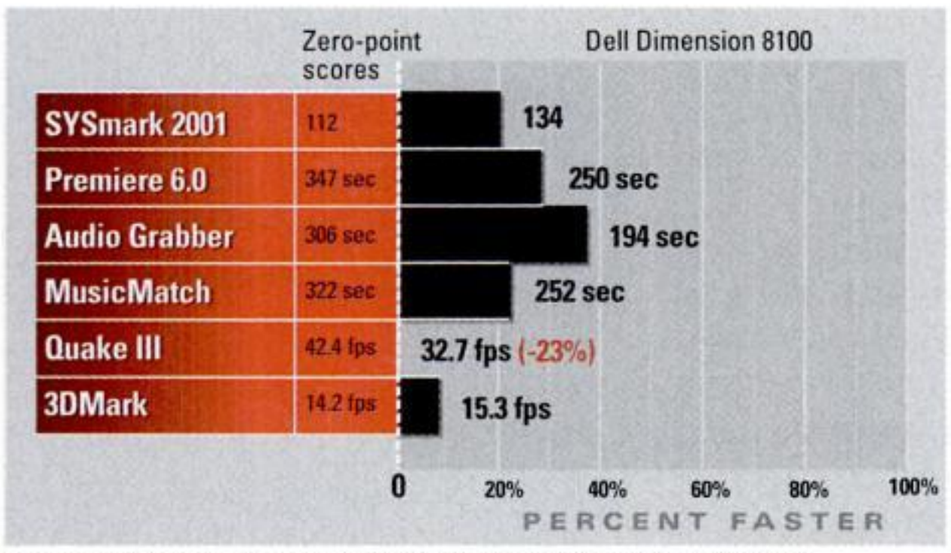
—ROB PRATT

UNDER THE HOOD

THE BRAINS	
CPU	Intel Pentium 4 1.7GHz
RAM	Two 64 MB PC800 RDRAM DIMMs
I/O ports	Two USB, one serial, one parallel, PS/2 key board and mouse
DISPLAY	
Videocard	VisionTek GeForce3 64 MB DDR RAM
Monitor	Monitor available but not reviewed
Refresh @max res	85Hz@1600x1200
STORAGE	
Hard drive	60GB IBM Deskstar, 7200rpm
DVD-ROM	16x Toshiba DVD-ROM
CD/RW	HP CD-Writer Plus 12/8/32
NETWORKING	
LAN	Onboard 10/100 Ethernet
Modem	N/A
SOUND	
Soundcard	Turtle Beach Santa Cruz
Speakers	Altec Lansing ADA885 digital THX surround
BUNDLE	

Windows ME, Dell *Picture Studio*, DellNet by MSN, *Image Expert 2000*, InterVideo *WinDVD 2000*, Microsoft Office XP small business edition, Roxio *Easy CD Creator 5*

BOOT: 34 sec. **DOWN: 8 sec.**



Full benchmarking details at www.maximumpc.com/benchmarking/index.html

MAXIMUMPC VERDICT

Dimension 8100
DELL

WHAT WE LIKE

The blazing-fast 1.7GHz Pentium 4 platform is paired with a forward-thinking videocard.

WHAT WE HATE

Outfitting this system with just 128MB of system memory is like putting a dinky rudder on the Titanic—and we know how well that turned out. We're also disappointed with the CD-RW drive and speaker choices.

888.999.3355 | www.dell.com

$2,500

6

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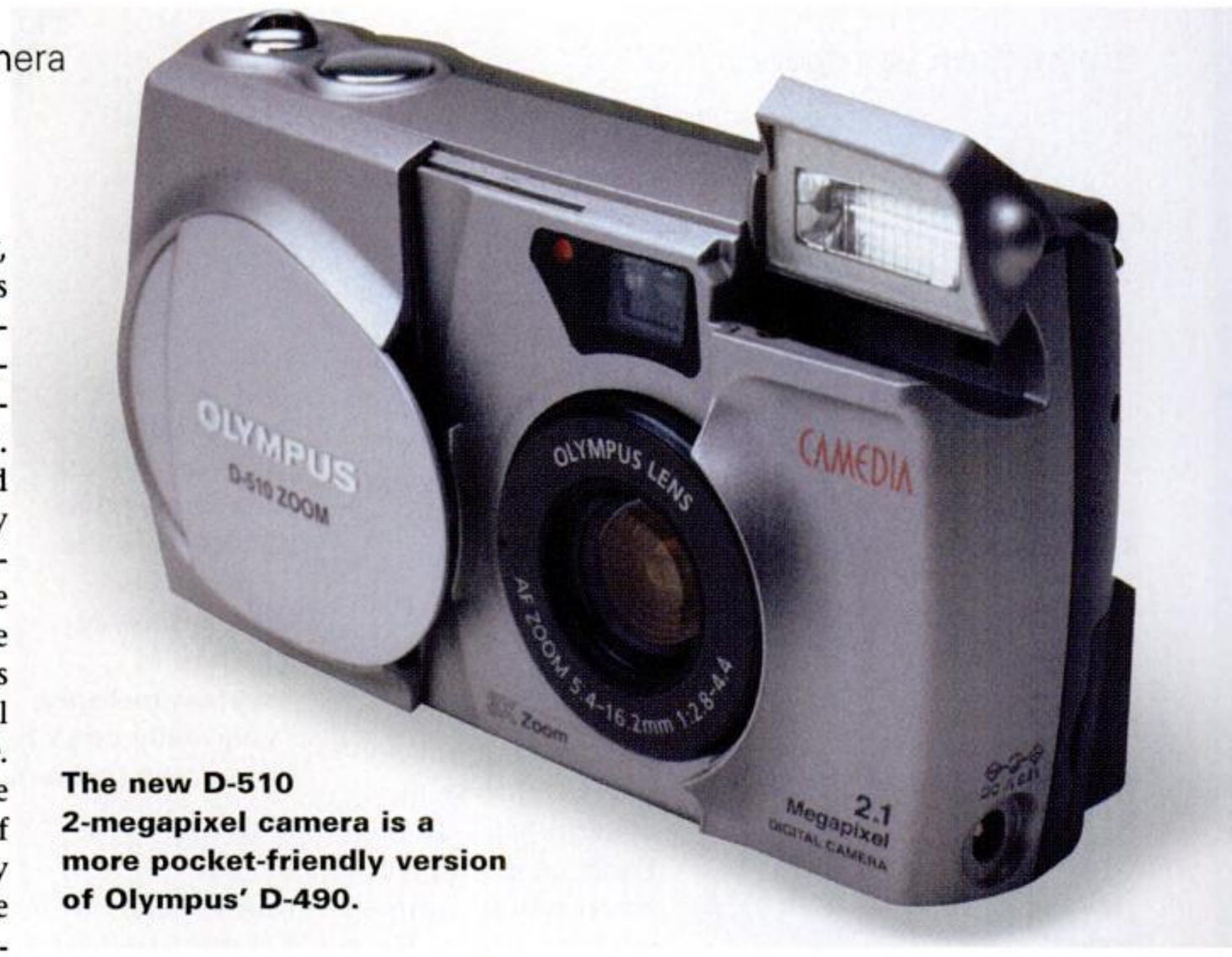
Olympus D-510

You can't do better in a 2-megapixel digital camera



The new D-510 2-megapixel camera is a more pocket-friendly version of Olympus' D-490.

In our July feature on digital imaging, we recommended the Olympus D-490 as the best buy in the mid-price range of digi-cams. We also promised a review of that camera's soon-to-be-released replacement, the D-510. Well, the new camera has arrived, and we're pleased to report that it's a worthy successor in the increasingly competitive 2-megapixel arena. Much more than just a D-490 with a facelift, the D-510 packs a bunch of new features and offers the best image quality of all cameras in the $300 to $700 price range.

While the D-490 was no porker, the D-510 is a sleeker, simpler version of its predecessor. And while not exactly tiny, the D-510 is also quite a bit more pocket-friendly. Olympus has minimized the number of buttons on the camera's rear by doubling up functions on each button. Admittedly, the camera's physical interface is a bit confusing at first, and we were even forced to resort to the user's manual (which isn't among the clearest we've read). But an open mind and a bit of time convinced us that the new button scheme is about as intuitive as the previous configuration.

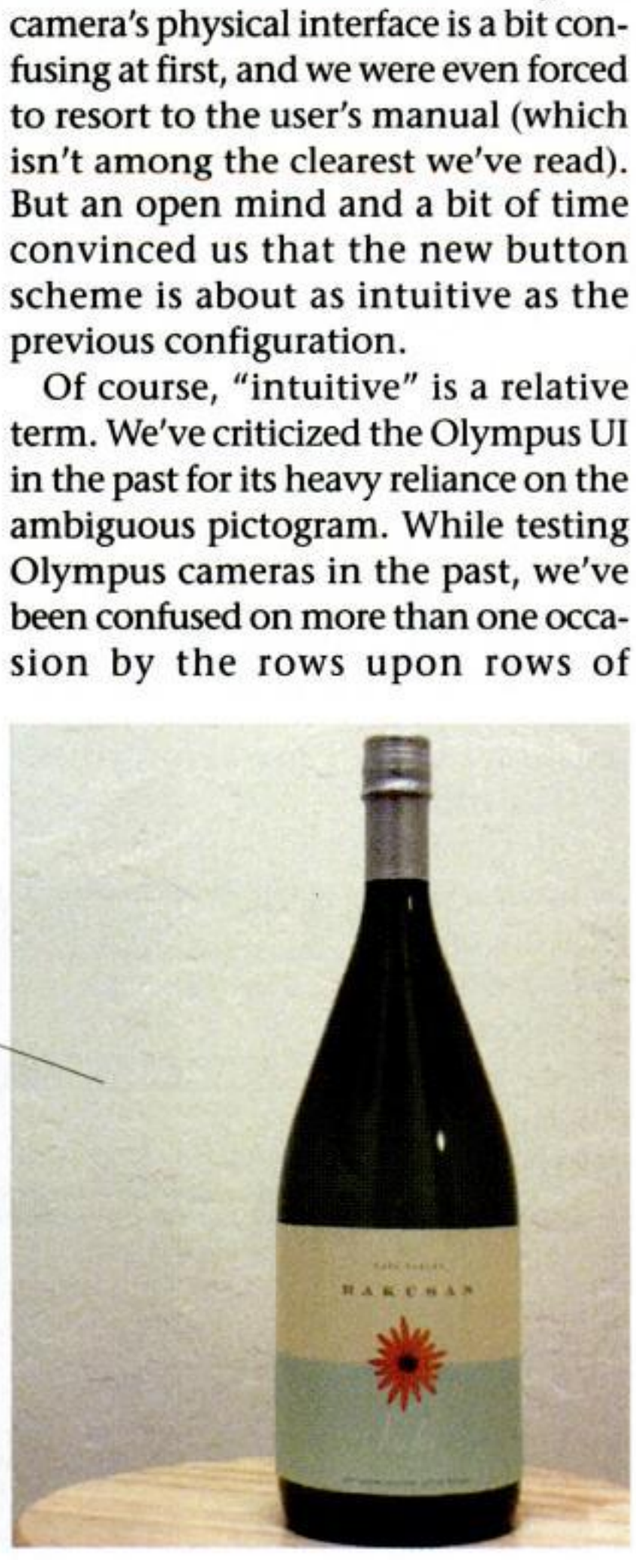
Of course, "intuitive" is a relative term. We've criticized the Olympus UI in the past for its heavy reliance on the ambiguous pictogram. While testing Olympus cameras in the past, we've been confused on more than one occasion by the rows upon rows of pictograms, leaving us struggling to find the QuickTime movie function or accidentally formatting the SmartMedia card. Thankfully, Olympus has addressed that issue and revamped the menu system, providing more explanatory text than was offered in the past. The menu still isn't as clear as on cameras from some other makers, but it's a step in the right direction. (The QuickTime movie function, though hidden in an entirely different way than on the D-490, still isn't well-marked.)

Despite quibbles with the interface, the D-510 excels where it matters most. The image quality ranks among the top 2-megapixel units (though it faces serious competition from the excellent Canon PowerShot A20). Definition and detail are commendable for a 2-megapixel camera. The D-510's ESP metering system delivers excellent automatic exposures, maintaining detail in both the highlights and shadows, and the automatic white balance was accurate in most instances. The color balance is generally true to life, although some of our test photos exhibited muddy blues.

The Olympus f/2.8-4.4 3x optical zoom lens is reasonably fast and produced some good low-light shots. Visual noise was minimal when flash was used, or in daylight shadows, but was fairly noticeable when shooting interiors dimly lit by fluorescent or tungsten lighting without a flash—a relatively common drawback of many consumer digital cameras. The zoom provides a focal range equivalent to 35-105mm in 35mm camera terms and is easy to operate, smooth, and responsive.

The D-510 boasts some useful features, too, such as a QuickTime movie mode that will record about 15 seconds of 15fps video at 320x240 pixels (or just over a minute at 160x120 pixels). The camera also uses Olympus' USB Auto-Connect, which means no driver installation is necessary—simply plug the camera into a USB port and it appears on your desktop as an external drive. Downloading your images is fast and easy, and it's one of the best reasons we've seen not to buy a card reader.

—MICHAEL SHAPIRO



Defining quality: In our test images, the D-510 captured detailed background textures, in both highlight and shadow, better than all other 2-megapixel cameras.

MAXIMUMPC VERDICT

D-510
OLYMPUS

WHAT WE LIKE

For a point-and-shoot camera, this sleek redesign of the Olympus D-490 has excellent image quality—and bonus QuickTime movie capability, too.

WHAT WE HATE

Just *try* to figure out how to shoot a QuickTime movie—we dare you. Though the D-510's user interface is an improvement over other Olympus cameras, it's still confusing.

888.553.4448 | www.olympus.com
$400

9

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Kenwood MP8017 CD/MP3 receiver

Yes, you *can* have mass music storage and ID3 tags in your car

Kenwood's MP8017 delivers everything a modern MP3 player must have, in a unit that's ready for the road.

In March, we roundly reamed a device called the Neo 35 for squashing our mobile MP3 dreams. Using a hard drive for storage duties, the Neo 35 sends an MP3 audio signal through your existing car stereo system and displays artist names and song titles on an LCD readout. Actually, this is what the Neo 35 does in an alternate universe where all consumer electronics work as advertised. In *our* universe, the Neo 35's hard drive failed to properly initialize about 95 percent of the time. This reliability rate might not seem so bad if you live in a former Soviet bloc country where the power shuts down intermittently and the train schedules are arranged by street gangs and even nuclear physicists start knife fights in bars, but if you live in the privileged, hedonistic U-S-of-A, you expect all consumer electronic devices to work properly every time they're turned on.

Alas, poor Neo, we knew you well—we just didn't like you very much. So we decided to hunt for the perfect road-faring MP3 solution. One built by an established electronics company that's intimately familiar with automobile power schemes. One that can display IDE tag information so we can view song and artist names while waiting at stoplights. One that can hold a humongoid amount of MP3 files. And one that boasts an easily navigated interface. We finally landed on the Kenwood MP8017, and it has enchanted us like a "Fantasy Island" adventure ever since.

The MP8017 plays both conventional audio CDs and data CDs burned with MP3 files (a single data CD can hold about 11.5 hours of music, assuming your songs are encoded at 128Kbps). Kenwood's manual instructs you to burn only 128Kbps MP3 files on your discs, but we tested an assemblage of bitrates ranging from 96Kbps to 192Kbps, and all played fine. Kenwood also recommends that you burn discs using the ISO 9660 format to ensure proper playback and file-name display. Unfortunately, ISO 9660 limits folder and file names to 31 characters, so if one of your MP3 files has a long-ass file name, the name will be truncated during the disc-burning process. Is this so bad? Yes, in some instances. If an MP3 file has embedded ID3 tag information, then the song and artist names defined in the tag will be displayed on the MP8017's crisp LCD ticker-tape readout (this is a must-have feature for all modern MP3 hardware). But if an MP3 file *lacks* ID3 tag information, the LCD will simply display the name of the file—which might have been clipped beyond recognition by the ISO 9660 burn process.

On a lark, we tested the MP8017 with discs burned in Joliet mode, and they played just fine—no audio problems, and ID3 tag info displayed properly. The MP8017 reads discs with nested folders, and navigating from folder to folder and file to file is so simple, it barely warrants a discussion here. Sure, we wouldn't mind if song names displayed more quickly during navigation, but the unit does have to extract the tag information before displaying it, and this takes a bit of time.

We installed the MP8017 in a 1997 BMW M3, and the car's sporty, teeth-rattling suspension didn't make the unit skip once. Sound quality was far superior to the M3's stock cassette deck, and we trust that as far as audio fidelity goes, the MP8017 will be an upgrade for the vast majority of drivers. The unit maxes out at 47 watts for each of its four channels, has a great AM/FM tuner, and boasts a faceplate that can be either flipped upside down (so crooks see only a piece of black metal) or removed entirely.

We're denying the MP8017 a Perfect 10 rating for two simple reasons: It doesn't support playlist files, and there's actually a *better* Kenwood model available! Kenwood's Excelon Z828 receiver includes the same MP3 hardware and functionality, but adds better sound fidelity and control, as well as a color readout that not only displays ID3 tag info but also animated graphics and sound-wave visualizations—which is exactly what you'll need if you want to turn the cabin of your car into a disco-on-wheels. Us? We just want an awesome mobile MP3 experience, and we found it in the MP8017.

Pretty face(plate): ID3 tag info takes a while to display, but when it does, you get a big, crisp, ticker-tape readout.

—JON PHILLIPS

MAXIMUMPC VERDICT

MP8017
KENWOOD

+ WHAT WE LIKE

650MB of storage, ID3 tag readouts, awesome sound quality—and reliable performance.

– WHAT WE HATE

There's almost nothing to hate, though we'd like to have support for playlists and flash upgrading, as well as an easier-to-read user's manual.

800.536.9663 | www.kenwoodusa.com
$360

9

Copyrighted material

21-inch Toss-Up

Very little separates the two best CRTs we've ever seen

If you want the best 21-inch CRT ever made, you'll have to cough up $1,500 for the F520.

Maximum PC has been singing the praises of Sony monitors since time immemorial. Sony this, Sony that—Sony, Sony, Sony. Now, we're always happy to evangelize kick-ass hardware, but... FOR THE LOVE OF GOD, SOMEONE PLEASE BUILD A MONITOR THAT CAN DEFEAT THE SONY DYNASTY!!!

Actually, NEC-Mitsubishi has built a monitor that comes damn close to beating Sony's best 21-incher. Mind you, the NEC FP1375X isn't *better* than the Sony F520, but at just two-thirds the price, it's an incredible bargain.

Screensavings: At just $1,000, the NEC FP1375X is a steal.

SONY F520

Like its predecessor, the F500, the F520 boasts a perfectly flat screen surface that not only fosters a more natural viewing experience (it turns out that humans actually prefer seeing flat images on flat displays), but also helps reduce reflections from ambient light. The F520 also shares the F500's colorful brilliance, 19.8-inch diagonal viewing area, and 0.22mm grille pitch, which is the finest grille pitch in the known consumer universe.

The F520 improves upon the F500 with higher resolutions, faster refresh rates, and better geometric accuracy. The F500 hit 80Hz at its maximum resolution of 1800x1440. The F520, meanwhile, can reach as high as 2048x1536, and at 1800x1440, it can hit 85Hz. Now, CAD-level resolutions are all fine and dandy for bragging rights, but even hardcore home enthusiasts can appreciate faster refresh rates, as well as the F520's improved geometric accuracy.

You might wonder how a CRT with a flat screen can suffer geometric accuracy problems. Well, while a flat screen does present a "geometrically familiar" screen image, it can also impair the actual geometric accuracy of the content being displayed. In worst-case scenarios, perfect circles and squares appear as oblong ovals and rectangles. The problem stems from the way a CRT's electron beams hit its aperture grille. As monitor screens progress in size, it becomes more and more difficult for their centrally positioned electron guns to hit the corners of the grilles—the beams' "impact angles," if you will, become too acute, and corner geometry suffers. To reduce the acuteness of the impact angles, engineers can opt to place the electron gun farther back in the tube assembly and/or curve in the corners of the screen. Unfortunately, the consumer public wants shorter-depth monitors with flatter screens, so flat-screen 21-inchers have always suffered heinous corner geometry. Until now. Through the magic of correction circuitry, both Sony and NEC have managed to achieve near-perfect geometric accuracy in the corners of their top-of-the-line flat-screen CRTs.

Sony's industry-leading grille pitch is what separates the F520 from the NEC FP1375X and all other competitors. Simply stated, the F520 offers the sharpest, most detailed picture of any monitor we've ever seen. This amazing image clarity earns the F520 an extra verdict point. Add in the cool silver body, BNC connectors, and four USB ports, and you have a Perfect 10.

NEC FP1375X

In the aperture-grille monitor arena, Mitsubishi used to be Sony's arch rival. But now that NEC and Mitsubishi have merged, the unified company is marketing the F1375X as an F520 killer. While the NEC FP1375X can't quite compare to the Sony F520—its 0.24mm grille pitch produces a visibly coarser image—it does match the Sony feature-for-feature in nearly all other areas. The FP1375X boasts a bright, brilliant, geometrically accurate picture, and can hit 2048x1536, as well as a bevy of super-high refresh rates. Like the F520, it offers a four-port USB hub, but lacks the F520's BNC connectors; you get a DVI input instead. Overall, the FP1375X is an incredible display—and compared to the Sony, it even proved to have slightly better grayscaling in the dark end of the grayscale spectrum. Unless you're absolutely committed to the F520's superior sharpness, the FP1375X is a more sensible purchase. You just can't do better for the $1,000 street price.

—JON PHILLIPS

DARE TO COMPARE

	Sony F520	NEC FP1375X
Viewable image area	19.8 in	20 in
Refresh@max res	75Hz@2048x1536	75Hz@2048x1536
Grille pitch	0.22mm	0.24mm
Weight	67.4 lbs	65.5 lbs
Dimensions (inches)	19.6(H)x19.6(W)x19.2(D)	19.7(H)x19.8(W)x18.9(D)

MAXIMUMPC VERDICT

GDM-F520
SONY

WHAT WE LIKE

With a flat screen, insanely high resolutions, and the finest grille pitch in desktop history, the F520 offers the best CRT monitor image, bar none.

WHAT WE HATE

Why does this beautiful piece of technology have to cost so damn much?

800.571.7669 | www.sonystyle.com
$1,500
10

MAXIMUMPC VERDICT

FP1375X
NEC-MITSUBISHI

WHAT WE LIKE

Awesome color, awesome resolutions, awesome everything. And most importantly, it's an awesome value.

WHAT WE HATE

So much promise—but it just can't beat the Sony's amazing grille pitch.

888.632.6487 | www.necmitsubishi.com
$1,000
9

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ePC-2

Diminutive system delivers less-than-laptop performance

Plenty of ports: Connections for audio and S-video out enable the ePC-2 to do multimedia—just not very well.

The ePC-2 is described as a "mini-book," but its formfactor is closer to that of a CD carrying case than a book.

Just a year ago, we might have applauded iBuypower's ePC-2 for loading desktop power into such a small case. But times have changed, and the performance gap between desktops and notebooks has narrowed. In fact, for evidence you can simply turn to our June review of the Dell Inspiron i8000 notebook. This hell-on-wheels includes a 1GHz processor and enough 3D-graphics oomph to exceed 90fps in *Quake III*. By contrast, the ePC-2—which is really closer in size to a CD carrying case than to a book—languishes in performance.

All that stated, the ePC-2 does have its charms. Its benchmark numbers don't scream "desktop replacement," and you'll need to supply your own monitor, keyboard, and mouse, but its extreme portability makes it suitable as a multiplayer game server for LAN parties or as a system for people who think even the smallest notebooks are still too large. Based on a teeny-tiny motherboard featuring Intel's i810E chipset, our review unit came with an 866MHz P-III and 256MB of PC133 SDRAM. The whole shebang comes en-tombed in a six-inch-square plastic case that sports a cupholder-size cooling fan and a CD-ROM drive—and little else.

Because Intel's core-logic chipset performs graphics and audio duties in addition to traditional motherboard chores, the ePC-2's video and sound performance unequivocally sucks. Yes, the i810E chipset does do 3D, and the ePC-2 can run *Quake III Arena*—but only at stultifying frame rates. Running our standard *Quake III* desktop system benchmark, the ePC-2 performed like a fat man in a snow drift, coughing up a mere 5.4fps. Dropping our standard *Quake III* settings to 800x600/16-bit color, the box turned out 19.4fps. This frame rate verges on playable, but just like that fat man running slightly faster in said snow drift, the resulting vision isn't much more pleasing. In tests with Klipsch's ProMedia 4.1 speakers, audio sounded muddy, though the ePC-2 heaped on plenty of gain.

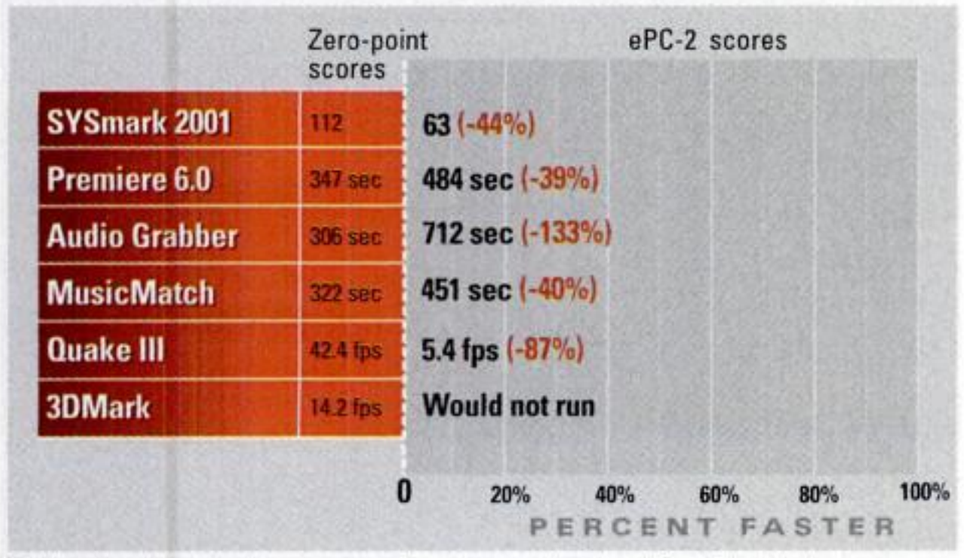
While the ePC-2 significantly lags behind both our desktop and notebook zero-point standards, it does excel as a lightweight server. For a home server, memory amount is more important than blistering CPU speed, and a small physical footprint is always preferred. Once configured as a mail, web, or MP3 server for a home network, the ePC-2 can easily live in a closet with only power and Ethernet cables taking up extra space. Maybe even better, the unit's fan isn't even loud enough to disturb nearby insomniacs trying to catch a few Zs. We tested the ePC-2 with Windows 2000 Advanced Server (which is finicky about the hardware it runs on), as well as a *Counter-Strike* server supporting an Internet game for eight players. In both cases, the ePC-2 worked fine.

Unless you're interested in a portable server or are smitten by the rig's novelty factor, the ePC-2 doesn't make much sense. However, with the addition of some real PC power, the ePC-2 could become very interesting very quickly. Our wish list? Bump up the processor to a Pentium III at 1GHz and drop nVidia's new nForce integrated graphics chipset onto this teensy mobo. Now that would make this wee PC a best-seller.

—ROB PRATT

UNDER THE HOOD

THE BRAINS	
CPU	Intel Pentium III 866MHz
RAM	256MB SDRAM
I/O ports	Serial, parallel, PS/2 mouse and keyboard, VGA, S-video, composite video, line in, headphone out, two USB, IrDA
NETWORKING	
Modem	Onboard V.90 56K
LAN	Onboard 10/100 Ethernet
DISPLAY	
Videochip	Intel 810 integrated graphics
Display	N/A
Refresh@ max res	N/A
STORAGE	
Hard drive	20GB
CD-ROM	NEC 24x
SOUND	
Audio chip	Onboard, stereo only
BUNDLE	
Windows ME	
BOOT: 40 sec.	**DOWN: 10 sec.**



Full benchmarking details at www.maximumpc.com/benchmarking/index.html

MAXIMUMPC VERDICT

ePC-2
iBUYPOWER

WHAT WE LIKE

Lots of system memory and a relatively roomy 20GB hard drive make this diminutive system a great foundation for a custom project.

WHAT WE HATE

Integrated graphics and audio with no upgrade options available mean that even some laptops come with more power than this freak of computing-kind.

888.462.3899 | www.ibuypower.com

$1,500

6

Copyrighted material

Hewlett-Packard Pavilion n5400

Plenty of CPU ponies, but not enough 3D oomph

The HP n5400 marks AMD's return to notebooks.

The n5400 is noteworthy for two reasons: It's only the second notebook PC we've seen that packs a combination DVD-ROM and CD-RW drive, and it's the first notebook we've seen that includes AMD's new Athlon 4 processor.

The Athlon 4 and the Pentium 4 might have the same numeral in their names, but the two chips couldn't be more different. The Athlon 4 is based on AMD's new Palomino core. Like the previous Thunderbird core, the Palomino uses a 0.18-micron process, but adds a slew of new instructions that are compatible with Intel's SSE instruction set. This means that all those floating-point-heavy games and applications that make use of SSE will finally receive a boost from AMD silicon. The Athlon 4 also features AMD's PowerNow, which offers incremental CPU throttling when power requirements demand it. The n5400, for example, clocks anywhere between 850MHz and 1GHz, depending on what applications you're running and whether you're on AC power or battery. Conversely, Intel's SpeedStep technology gives you just two speeds, high and low.

But perhaps the Athlon 4's most important improvement is in thermal management. AMD won't say how it did it, but the Athlon 4 is far cooler than CPUs based on the Thunderbird core. You can barely keep a T-bird cool in a desktop machine with elaborate heatsinks and multiple fans, but the Athlon 4 inside the n5400 reached only moderate temps during testing (though it still doesn't run as cool as Transmeta's Crusoe chip).

HP's n5400 pairs the Athlon 4 with Acer Labs' new Mobile MAGiK 1 chipset and PC133 memory. In our *SYSmark2001* benchmark, which tests a rig's performance in common Windows apps, the n5400 ran neck-and-neck with a 1GHz Pentium III-based notebook from Dell. In our *Photoshop 6.0* test, the Athlon machine's performance margin improved by 14 percent, and in our *Premiere 6.0* test, the P-III-based Dell pulled ahead of the Athlon by about 5 percent. The n5400's Toshiba combo drive turned in great audio extraction scores, as the drive has in other systems we've tested.

The n5400's main weakness is its Trident CyberBlade graphics chipset. An old-timer among graphics vendors, Trident made a valiant effort with the chipset, but stacked against nVidia's GeForce2 Go, CyberBlade just doesn't measure up for serious 3D chores. Gamers will definitely want to look elsewhere.

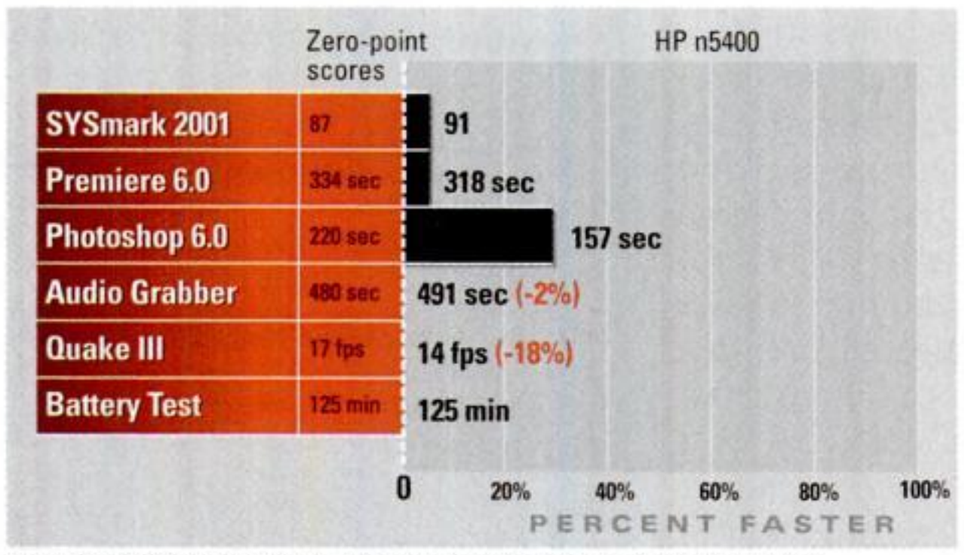
For connecting peripherals, the n5400 has almost all the must-have ports—serial, parallel, VGA out, Ethernet, two USB, modem, video out, a PS/2 connector, and two CardBus PC Card adapters. There's no FireWire port, but perhaps this isn't a grievous omission. Most people use FireWire for video capture, and, since the notebook has just a small 20GB hard drive, the n5400 isn't well-appointed as a mobile video-editing rig anyhow. But HP has paid special attention to people who use the notebook for audio purposes on an airplane—the notebook has a headphone jack mounted in front, and front-panel controls let you operate the CD player while the notebook's powered off. Another nice touch is the lock switch on the glide pad, which prevents your thumbs from hitting the pad during heavy typing and sending the cursor off into the wrong part of the screen.

Modular bays would make the notebook more flexible, and a 3D-capable graphics chipset would give AMD-lovin' gamers a first-choice notebook. But, overall, the n5400 is a solid, well-performing notebook that won't break the bank.

—GORDON MAH UNG

UNDER THE HOOD

THE BRAINS	
CPU	AMD Athlon 4 PowerNow 1GHz/850MHz
RAM	128MB PC133 SDRAM
I/O ports	Dual CardBus PC Card slots, VGA, composite video, parallel, serial, two USB, PS/2 mouse, line in, headphone
NETWORKING	
Modem	Lucent V.90 WinModem
LAN	10/100 Ethernet
DISPLAY	
Videochip	Trident CyberBlade XP
Display	15in XGA
Max res	1024x768, 32-bit
STORAGE	
Hard drive	IBM Travelstar 20GB
DVD-CD/RW	Toshiba SD-C2002
Floppy	1.44MB 3.5in
SOUND	
Audio chip	ESS Allegro PCI
WEIGHT	
Lap weight	7.5 lbs
Carry weight	7.9 lbs
BUNDLE	
Windows ME, *Money 2001, Works 6.0, QuickLink III, Wild Tangent Web Driver, Encarta, MusicMatch,* InterVideo *WinDVD 2000*	



Full benchmarking details at www.maximumpc.com/benchmarking/index.html

MAXIMUMPC VERDICT

Pavilion n5400
HEWLETT-PACKARD

WHAT WE LIKE

You can't help but love the 1GHz Athlon 4 performance and the solid feel of the case.

WHAT WE HATE

There're plenty of processor ponies, but not enough graphics horsepower. The Trident CyberBlade can't compete with nVidia's GeForce2 Go.

800.752.0900 www.hp.com
$2,100

7

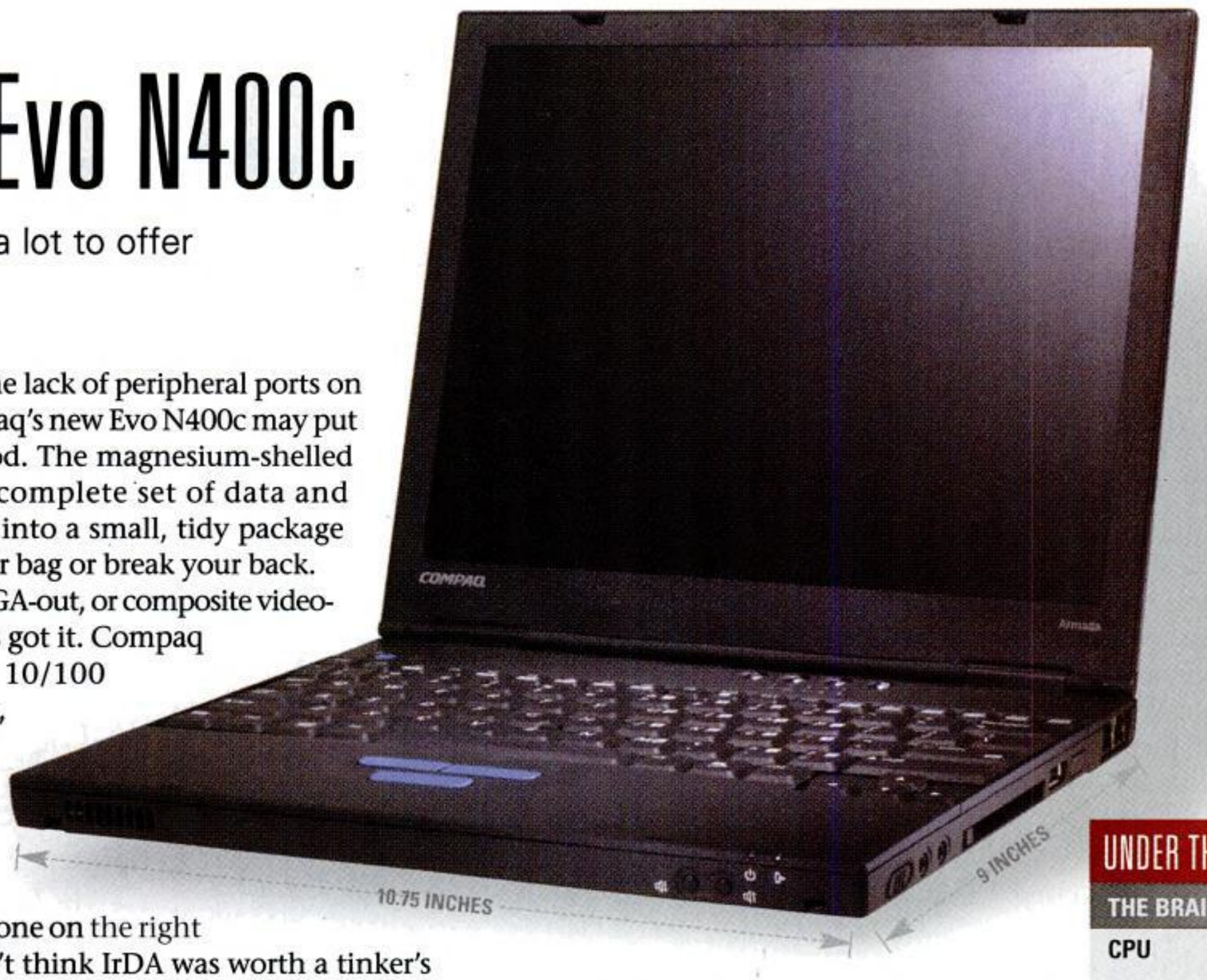
Copyrighted material

Compaq Evo N400c

Little notebook has a lot to offer and long battery life

If you've ever cursed the lack of peripheral ports on ultra-portables, Compaq's new Evo N400c may put you in a happier mood. The magnesium-shelled Evo notebook packs a complete set of data and audio/visual connectors into a small, tidy package that won't clutter up your bag or break your back.

Need a serial, parallel, VGA-out, or composite video-out connector? The Evo's got it. Compaq also manages to jam a 10/100 Ethernet port, a V.90 modem, and two USB ports into the N400c. We're also pleased to report that Compaq continues to build IrDA ports into its portables; the N400c has one on the right side of the case. We didn't think IrDA was worth a tinker's damn when it was first introduced with Windows 95. After all, no devices back then even included IrDA ports! But now that so many PDAs and wireless devices communicate via IrDA, we've warmed to the whole infrared concept.



There's a lot to like about Compaq's svelte new Evo N400c, including two-battery capacity and relatively high positioning on the case reserved for WiFi.

Even though Compaq includes the IrDA port, the company tacitly acknowledges that other wireless technologies will become prevalent. To wit, a small portion of the Evo's lid is set aside for a WiFi or Bluetooth card. Compaq says WiFi reception improves when the transceiver is moved from the PC Card slot (its traditional position) to the back of the display. In this new position, the WiFi card has more "altitude," if you will, and therefore better reception. We can certainly attest to the flakiness of WiFi cards in PC Card slots: If the antenna angle is wrong or your body gets in between the antenna and the access point, you lose your connection. Compaq didn't have the WiFi MultiPort available for testing at the time of our review, so we can only hope that it works as well as Compaq promises.

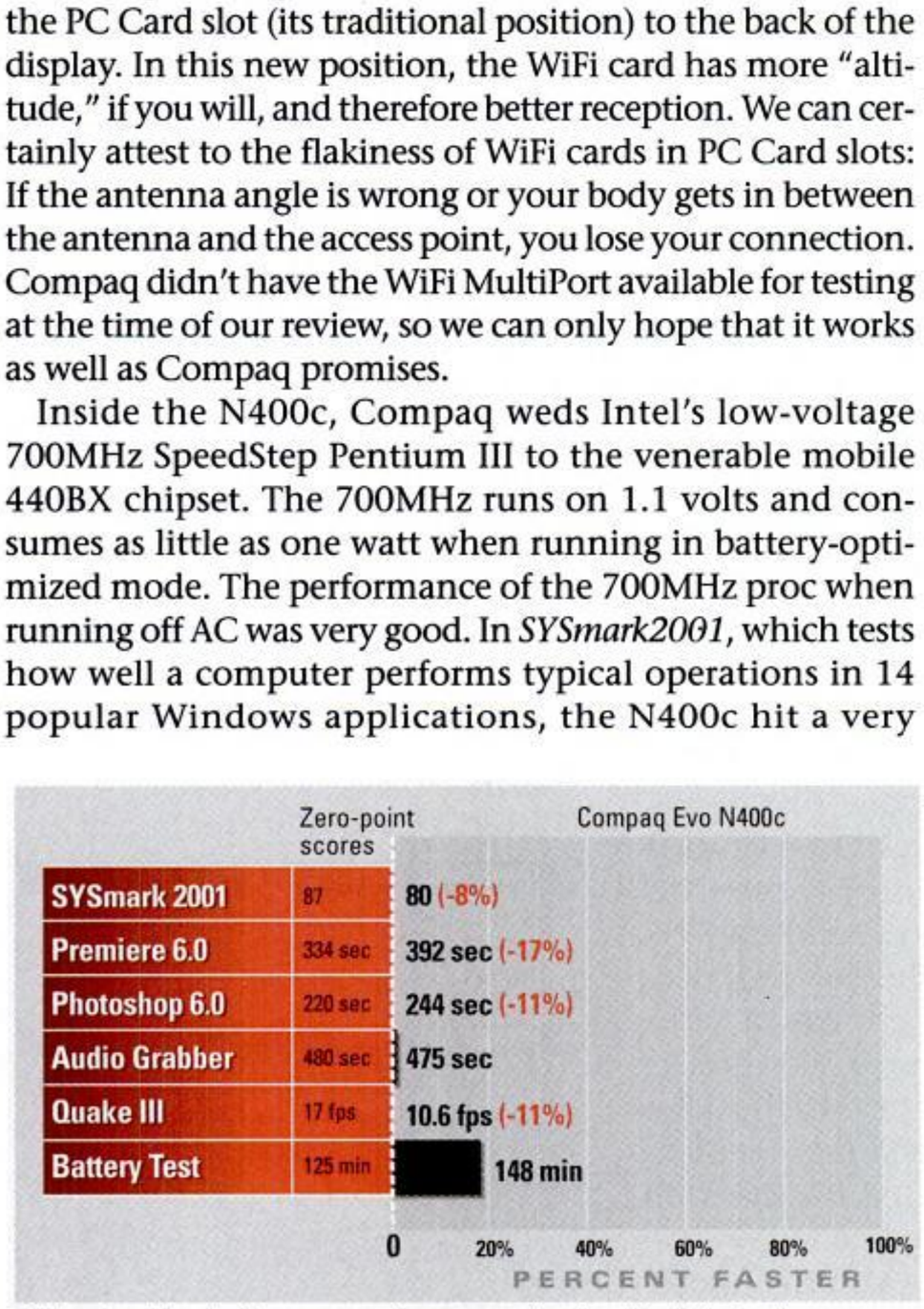
Inside the N400c, Compaq weds Intel's low-voltage 700MHz SpeedStep Pentium III to the venerable mobile 440BX chipset. The 700MHz runs on 1.1 volts and consumes as little as one watt when running in battery-optimized mode. The performance of the 700MHz proc when running off AC was very good. In *SYSmark2001*, which tests how well a computer performs typical operations in 14 popular Windows applications, the N400c hit a very respectable 80 points. If that doesn't sound impressive next to the 168 that an Athlon 1.4GHz desktop system cranks out, keep in mind that it's 11 percent better performance than a 700MHz classic Athlon desktop.

By a neat sleight of hand, the N400c can carry two batteries without affecting the unit's bulk. One battery resides inside the rear of the machine near the hinge, and the second regular- or high-capacity battery clips to the back of the notebook. With an internal battery and a regular-capacity external battery installed, the Evo scored 148 minutes in our battery-life test. When you need a little extra battery power and more storage options, the optional docking station works with another two batteries or a host of different drives (just be aware that the docking station offsets the Evo's trim traveling weight and portability).

As impressive as the Evo is on the whole, we were bothered by some important details. Even with 8MB of memory, the ATI Mobility M graphics chipset is a non-starter for any intensive 3D gaming. Most owners of ultra-portables will never venture beyond a game of *The Sims*, but we'd love to see ATI's Mobility Radeon or nVidia's GeForce2 Go in an ultra-portable. And because the N400c doesn't come with an optical drive, the only way to watch a DVD is to drop the N400c onto the optional docking station. We advise you to buy a notebook with a built-in optical drive if you intend to watch movies in-flight while still traveling light.

Overall, the N400c Evo is a great notebook for people who expect to add WiFi, want a full-size keyboard in their ultra-portable, and don't mind using a docking station to access the optical drive.

—GORDON MAH UNG



Full benchmarking details at www.maximumpc.com/benchmarking/index.html

UNDER THE HOOD

THE BRAINS	
CPU	Intel Mobile Pentium III SpeedStep 700MHz/500MHz
RAM	128MB PC100 SDRAM
I/O ports	Dual CardBus PC Card slots, VGA, composite video, parallel, serial, two USB, PS/2 mouse, line in, headphone
NETWORKING	
Modem	Lucent V.90 WinModem
LAN	Intel Pro/100 P
DISPLAY	
Videochip	ATI Mobility 8MB
Display	12.1in
Max res	1024x768, 32-bit
STORAGE	
Hard drive	IBM Travelstar 20GB
DVD-CD/RW	Compaq 8x DVD-ROM
Floppy	1.44MB 3.5in
SOUND	
Audio chip	ESS Allegro
WEIGHT	
Lap weight	3.5 lbs
Carry weight	4.4 lbs
BUNDLE	
Windows 2000	
BOOT: 54 sec.	**DOWN: 10 sec.**

MAXIMUMPC VERDICT

Evo N400c
COMPAQ

WHAT WE LIKE

One battery not enough? How about four? This notebook packs long battery life into a light case.

WHAT WE HATE

A case locked down with Torx screws instead of Philips screws makes upgrading difficult.

800.888.0220 | www.compaq.com
$3,105

9

Copyrighted material

Celestix Aries 310

The super-router has arrived

At seven inches tall, this is a server of Liliputian standards. But don't let its size fool you—the Aries 310 is more than able to handle the serving needs of a small web site.

Config-o-rama: The Aries' LCD panel allows users to perform basic configuration tasks, enable or disable services, and shut down the server. All other configuration tasks are handled through a web browser interface.

The Aries 310 has all the inputs and outputs of a normal PC, plus PCMIA slots and two Ethernet ports.

RAW DATA	
CPU	700MHz Celeron
RAM	64MB
Hard drive	10GB
LCD resolution	128x64

What's silver, weighs 2.2 lbs, and can handle almost all of your networking needs? Why, that would be the Celestix Aries 310. This little silver box provides everything that a small home or office network could possibly need. The Aries will handle all your network routing and serving duties. It's a web server, e-mail server, file server, print server, and database server—all in a 7-inches-tall package. This magic happens courtesy of the Aries' 700MHz Celeron and a custom OS based on the 2.2 Linux kernel. The most beautiful thing about the Aries 310 is that it's incredibly easy to set up and configure. We had a test unit up and running in about half an hour.

If you're considering a plain-Jane DSL or cable router, you might want to think about the Aries. Instead of dropping a low-powered CPU and two network interfaces in a box and calling it a router, Celestix has done nothing less than configure a real PC, integrate an LCD panel, and include a unique version of Linux, complete with a bozo-proof configuration interface that steps you through everything from setting up an IP address to configuring a web server. This box is perfect for anyone who has broadband and wants to host a low-traffic web site.

So what else will the Aries 310 do for you besides serving your web pages and sharing a single Internet connection with all the computers on your LAN? Well, because the Aries 310 runs Linux, it can do anything that a Linux machine can do. This might entail running a mail, FTP, or network file server; fine-tuning the included firewall; setting up a database server; and running most any Linux app that you can think of. The Aries will even replace your WiFi router! All you need is a Lucent chipset-based 802.11b card to enable the wireless LAN router.

Although you can use the Linux command line (via Telnet) to play MP3s (using the integrated sound on the Aries' i810 chipset), we'd like to see a simple web interface for setting up MP3 playback. And while we're on the subject of MP3s, we need to state that the Aries 310's puny 10GB drive is a little cramped if you plan on using this box to serve music. We also found certain functions a bit difficult to configure, particularly the DNS server settings. Once we used the auto-configuration utility, there was no easy way to access or change the DNS configuration using the tools provided.

For such a little bugger, the Aries 310 is fairly noisy. While we couldn't hear its normal operating drone over the noise of a standard desktop box, once the other computers were turned off, the Aries 310's high-pitched whine slowly drove everyone in the room crazy. We wouldn't recommend setting this guy up in a bedroom.

If you've been thinking about setting up a Linux server, the Aries 310 is a reasonably powerful contender in a convenient wrapper. We absolutely love the LCD user interface and the advanced configuration options available to anyone comfortable with a Linux command shell. For something that offers so much functionality, the Aries 310 is soundly priced at $1,000.

—WILL SMITH

MAXIMUMPC VERDICT

Aries 310
CELESTIX

WHAT WE LIKE

The Aries 310 is awesome! No true Linux geek should be without one. Who wouldn't love a Linux box that fits in your pocket?

WHAT WE HATE

While a 10GB drive might be sufficient for an office, we demand more space for our MP3s and digital videos. The Aries 310 is also a little loud for a quiet, home-type environment.

888.814.2338 | www.celestix.com

$1,000

9

Copyrighted material

Sony Spressa Double Density CD-R/RW Drive

The slow and the spurious

The Double Density drive comes in a handsome silvery finish that would look horrible in a beige box, but fantastic in a VAIO. Coincidence?

While ultra-high-capacity optical storage technologies like DVD-R remain priced out of reach for us proles, the flagging CD-R format is getting a makeover from Sony. The new spec is called Double Density CD-R/RW and appears first in Sony's Spressa CRX200E drive.

Sony R&D tweaked the existing CD format (see page 40 for an in-depth look) to raise disc capacity to 1.3GB, while maintaining backward-compatibility with conventional CD-R and CD-RW discs. That's right: You can burn both Double Density discs *and* traditional CD-Rs and CD-RWs. At $2 to $3 for each piece of 1.3GB media, Double Density discs are extremely cheap. Unfortunately, the technology's first-gen speeds and capabilities are less than kick-ass.

We first tested the Spressa with Nero's *CDSpeed2000*, which gave the Double Density drive an average read rating of 24.7x and random/full-stroke access times of 128/166ms. These results don't live up to Sony's advertised 32x rating and 150ms access-time specification, but, then again, *CDSpeed2000* wasn't designed to measure the performance of Double Density drives. Because of this—as well as the fact that no other benchmarking software supports the DD standard right now—we decided to drop our usual optical drive testing procedures, and focus on real-world file-transfer tests. Sadly, even in the "real world," the drive didn't fare much better.

We began by recording a 647MB mix of small and large data files to a standard 650MB CD, a process that took 431 seconds— 20 seconds slower than TDK's 12x burner. When we doubled the files to just under 1.3GB, the drive did a little better, taking 767 seconds to record the entire disc.

You might expect that 1.3GB of rewritable media suddenly makes CD rewriting sound sexy, but you'll die a thousand deaths waiting for this drive to finish its RW chores. Formatting a 1.3GB took 19 minutes, and filling the same disc with 1.3GB of data cut another 19.5 minutes out of our day. And while the Spressa is burning, don't touch that keyboard. Sony has traded buffer-underrun protection for a huge, 8MB cache. Consequently, we caused a buffer underrun simply by running a 200MB file transfer between hard drives at the same time we attempted to burn a Double Density disc.

While the new Spressa drive is fully compatible with the existing CD-R and CD-RW formats, your current optical drive won't be able to read or write to Double Density discs. And unless Sony goes on a licensing frenzy—a strategy the company's not known for—your 1.3GB disc has limited usefulness. Double Density discs cannot be used to record audio CDs, nor do they conform to the MultiPlay spec that will allow consumer electronic devices to play MP3s burned onto CDs.

Not all the news from Sony is bad, however. A surprising plus is the Spressa's flawless digital-audio extraction, which is usually the weakest feature of specialty drives. Though it's nowhere near the fastest ripper—it took 364 seconds to extract 72 minutes of audio from a stamped CD—the Spressa pulled an accurate stream from the disc, and the DAE quality returned by *CDSpeed*'s DAE test was rated a Perfect 10 (we confirmed this awesome rating by listening to the first and last tracks, where clicks and pops are most likely to occur). Another nice feature is support for writing in RAW DAO mode, which comes in handy when backing up games.

The Spressa CRX200E is way behind the speed curve, but it does offer something new in storage that other comparably priced optical drives don't. The equation couldn't be more simple: If you need cheap mass storage, and speed isn't an issue, then you'll be very happy with this reliable drive. So why are we complaining? Because we're ingrates, and because we think that drive speeds ought to scale with expanding media sizes so we don't have to return to the prison of long burn-times. It's too bad that the Double Density CD-R/RW isn't much more than a minor extension of an aging technology.

—JON PHILLIPS

THE BUNDLE

CD Extreme, abCD, Retrospect Express, Spressa Liquid Player

RAW DATA

	CD-R performance	DD CD-R performance
Average data transfer (MB/sec)	2.92	2.60
Random/full-stroke seek (ms)	128/166	202/258
Audio extraction (secs)*	364	N/A
Data CD burn (secs)**	431	767
CPU utilization (at 8x)	17%	18%

* Test performed on a 72-minute audio CD.

** Test performed with 647MB and 1.29GB of data files for CD-R and DD CD-R, respectively.

MAXIMUMPC VERDICT

Spressa CRX200E Double Density Drive
SONY

WHAT WE LIKE

Sony extends the life of the CD-R with a cheap and backward-compatible storage medium that doubles storage capacity.

WHAT WE HATE

Double Density discs can't be read by conventional CD/CD-R/CD-RW drives, and whether a new CD format will be embraced by an adoring public is uncertain. And where's the buffer-underrun protection?

800.571.7669 | www.sonystyle.com

$250

6

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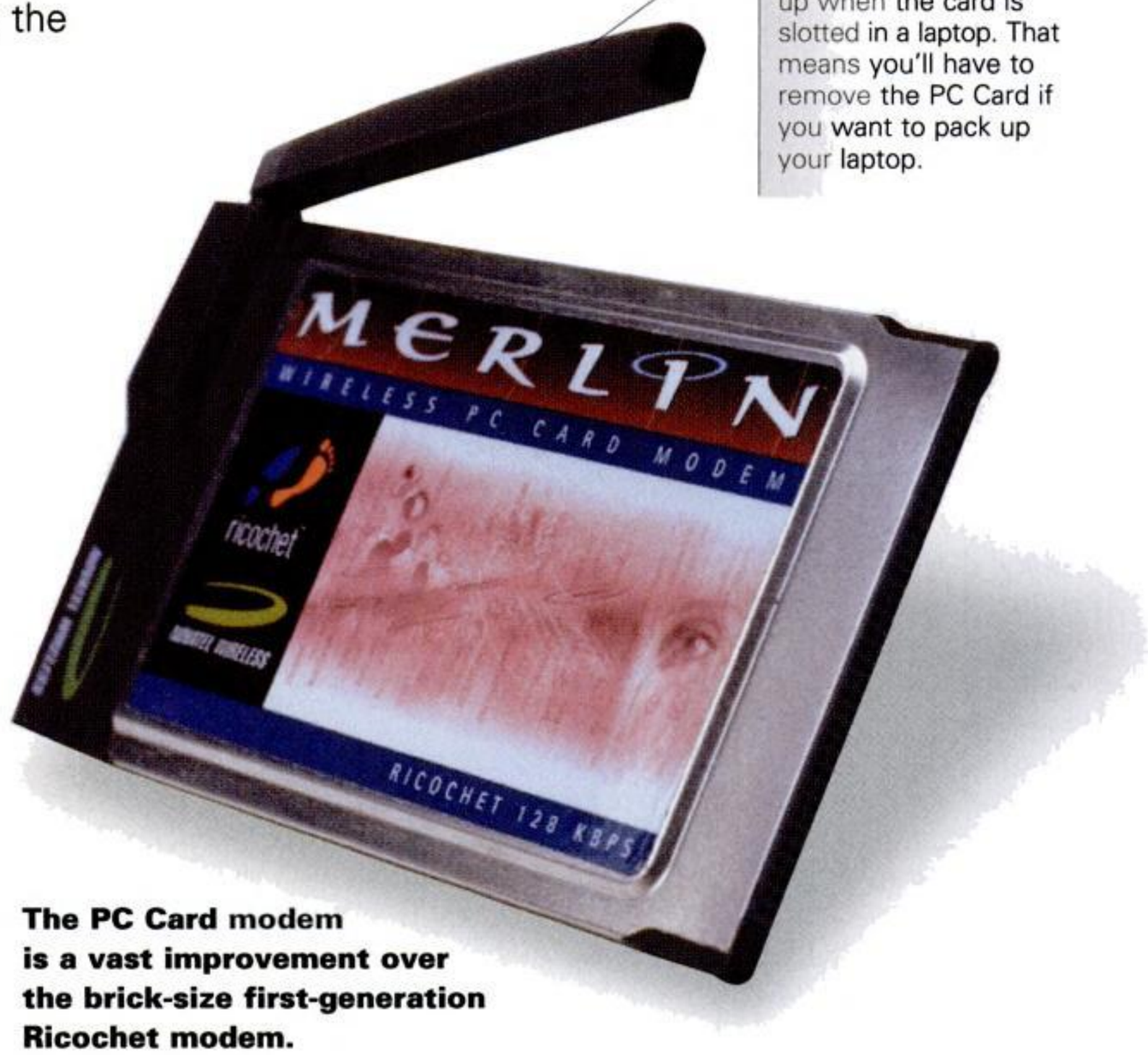
Ricochet WebConnect 128Kbps

It's wireless and truly portable, but a far cry from the perfect Internet experience



Hanger-on: The 5-inch antenna on the PC Card wireless modem doesn't fold up when the card is slotted in a laptop. That means you'll have to remove the PC Card if you want to pack up your laptop.

The PC Card modem is a vast improvement over the brick-size first-generation Ricochet modem.

NOTE: As we were going to press, Metricom, which runs the Ricochet service, filed for bankruptcy. (The company says existing Ricochet subscribers will continue to receive service.) Unfortunately, the announcement was made after we committed the following review to print. Regardless, we expect that some day the technology reviewed below will be revived.

It's like 1999 all over again. That was the last time *Maximum PC* staffers still had to suffer through dial-up Internet connections. But that doesn't mean we can't reminisce—and Ricochet WebConnect 128Kbps service helps us recall all that wonderful, old-time, dial-up nostalgia.

Like our first dial-up net connections, WebConnect 128Kbps demands some tricky configuration. But this latest generation of wireless Internet service finally delivers better portability (in the form of less-cumbersome hardware) and faster bandwidth. In return for the relatively swift—and completely untethered—net access, you only need suffer limited coverage and a steep price.

For this review, Ricochet WebConnect sent us a Novatel wireless PC Card modem with a 5-inch antenna. This widget is a vast improvement over the brick-size serial port modems required by earlier Ricochet wireless Internet schemes. The old modems were bulky and had to be attached directly to a notebook's front cover. But the PC Card modems are small and slide right into waiting PC Card slots. Unfortunately, the modem antenna sticks out precariously and only swivels flush with the PC Card when the card *isn't* slotted into a notebook—so you can't leave the PC Card in your notebook when you fold up your system and stash it in a carrying bag.

Configuring the 128K Ricochet service took us about 30 minutes. The setup application installs drivers and shuffles through the process of establishing a dial-up connection, but we had to spend some time troubleshooting the connection afterward. Unlike most dial-up,or point-to-point (PPP), connections these days, Ricochet WebConnect's system didn't automatically configure our laptop with gateway and DNS server addresses. Once we had entered these addresses manually, however, we could get on the Internet in about the time it takes for a regular analog modem to establish an Internet connection.

Sadly, our troubles didn't end with the missing IP addresses for Internet routing and name servers. When launching the wireless connection, Windows 2000 threw up alert dialogs reporting that the OS couldn't find the modem. It was a benign (though entirely annoying) quirk; despite the alerts, we were able to jump online.

We ran outdoor tests in several locations along the western expanse of Ricochet's Bay Area coverage zone and found almost-uniformly fast service. While we never hit 128Kbps downloads, we measured between 95Kbps and 98Kbps download speeds from San Jose to San Francisco. In isolated pockets where 128Kbps service is under construction, such as in Santa Cruz (at the southern tip of the Bay Area) and in Brisbane (at *Maximum PC*'s San Francisco peninsula offices), service ranged from 26Kbps to 34Kbps. That's definitely an improvement over the top speed of the first generation of Ricochet service, but it's painfully slow compared to even 56K modem throughput. And if you don't live in one of the 12 major metropolitan areas covered by Ricochet service, you're totally out of luck.

Despite the configuration hassles and the limited 128Kbps coverage, Ricochet's revved-up WebConnect service gets you on the Internet with reasonable speed. With a PC Card modem and 128Kbps service, the second generation of wireless Internet service is much more impressive than its predecessor. But it still has a long way to go before it's useful—or even appealing—for more than the most hardcore niche of mobile PC users.

—ROB PRATT

MAXIMUMPC VERDICT

Ricochet WebConnect 128Kbps
WIRELESS WEBCONNECT

WHAT WE LIKE

High bandwidth service delivers reliable speed across coverage zones, and the PC Card wireless modem is a vast improvement over first-generation external serial port modems.

WHAT WE HATE

The PC Card's antenna doesn't fold up for portability, and that leaves you continually inserting and removing the card from your laptop if you want to stay mobile.

800.811.7426 www.wirelesswebconnect.com
$300 for PC Card modem
$75 for monthly service

6

Copyrighted material

Kyocera QCP 6035

Finally, an all-in-one PDA/cell phone that doesn't compromise usefulness

You already take your cell phone with you whenever you leave your home or office—so why not combine it with your PDA, killing two gadgets with one stone? With Kyocera's QCP 6035 smartphone, you can have both a full-featured PDA and a capable cell phone permanently at your side—without carrying extra gear. Is the 6035 perfect? No. But it does one-up the Nextel and Ericsson smartphones we reviewed last month.

At 5.6 inches tall and 2.5 inches wide, the 6035 is one burly mother. In fact, it almost looks like Kyocera started with a Palm V, then reshaped it into a longer, narrower device without trimming any of the overall mass. The result is a 7.5-ounce phone, considerably heavier than any other smartphone we've tested. The 6035 isn't too big to fit in a jeans or T-shirt pocket, but the sheer bulk of the device will likely cause unsightly bulges and drooping.

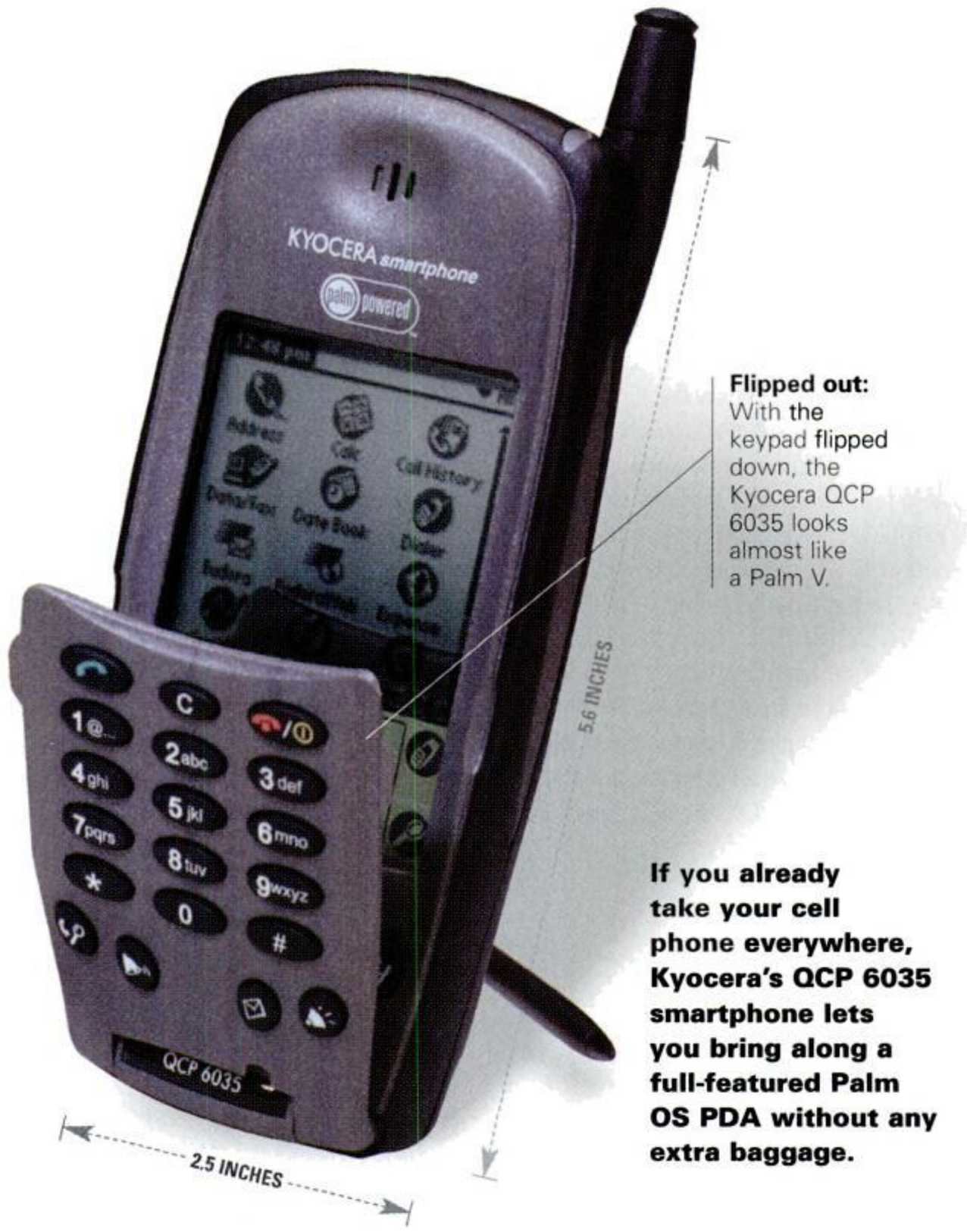
Compared to other PDA processors, the 6035's proc is on the slow side. During testing with Quartus Forth's *Benchmark 2.0* (which uses a Fibonacci sequence to examine processor speed and memory bandwidth), the 6035 scored between a Palm Vx and a Palm IIIe, with a rating about half that of the latest Palm and Handspring models. Nonetheless, we didn't expect much from a device that does dual-duty as a cell phone and a PDA, and despite the average rating in *Benchmark 2.0*, the 6035 launched apps quickly (and it was much faster than the next-fastest smartphone we've tested, Ericsson's R380).

The 6035 uses a flip-down keypad to switch between phone and PDA modes. In phone mode, the keypad remains up, covering the lower half of the backlit, monochrome LCD screen. In PDA mode, the keypad flips down to expose the entire 2x2-inch screen, a 0.75x2-inch text-entry pad, a set of four hot buttons, and a rocker key that's common among Palm OS devices.

Of course, in cell-phone mode, the 6035's screen suddenly becomes generous. Instead of using arrow keys to step through menus, the 6035 uses a jog dial on the phone's left edge.

As a PDA, the 6035 is easily the most full-featured and easy-to-use smartphone we've tested. After all, you can load it with any applications from the extensive Palm OS software library. The phone's 8MB of memory is standard for Palm-based PDAs, and most people will find that it's plenty spacious.

Just like any other Palm device, you download apps and synchronize e-mail, calendars, and to-do lists with a PC by using the *Palm Desktop* application's Hot Sync.



Flipped out: With the keypad flipped down, the Kyocera QCP 6035 looks almost like a Palm V.

If you already take your cell phone everywhere, Kyocera's QCP 6035 smartphone lets you bring along a full-featured Palm OS PDA without any extra baggage.

The 6035 comes with a charger/ cradle that connects to a PC with a serial cable. The cradle uses a proprietary connector, however, so despite the Kyocera's Palm OS-compatibility, you can't use any of the familiar peripherals made for Palm or Handspring PDAs.

The 6035 supports CDMA digital cellular, CDMA digital PCS, and analog (or GSM) wireless standards. Because the 6035 uses a real web browser (instead of leaning on WAP to translate HTML pages or simply displaying raw text data, ugly HTML tags and all), web pages on the 6035 load quickly and render in a readable format.

Kyocera's QCP 6035 is the first smartphone to get the concept right. It's both a great cell phone and a great PDA. But for the hefty price of $500, we'd like something a little more petite.

—ROB PRATT

RAW DATA

Dimensions	5.6in x 2.5in x 0.86in
Weight	7.34oz
Memory	8MB
Wireless modes	CDMA digital PCS, CDMA digital cellular, and analog (GSM)
Data modes	HTML, WAP, SMS

MAXIMUMPC VERDICT

QCP 6035
KYOCERA

WHAT WE LIKE

The Palm OS is effective and expandable, and believe it or not, it runs efficiently on a cell phone.

WHAT WE HATE

It's so big and heavy, you can build up your biceps by simply lifting it to your ear.

800.349.4188 | www.kyocerawireless.com
$500

8

Reprinted material

The Sound and the Fury

Bad speakers, lame drivers, and idiotic ideas put us in a very nasty mood

Altec Lansing AVS-500

Altec Lansing may be duking it out with Klipsch over the coveted THX PC speaker crown, but that hasn't prevented the company from pursuing the budget 4.1 market. Altec Lansing's latest low-end theory: the AVS-500. The proof, though, is in how the speakers sound. Unfortunately, the AVS-500s are barely acceptable for Joe Sixpack and are an absolute affront to audiophiles.

WHAT WE LIKE: Solid lows boom out of a powerful subwoofer, and because installation is so easy, you can start rattling windows almost as soon as the speakers are out of the box.

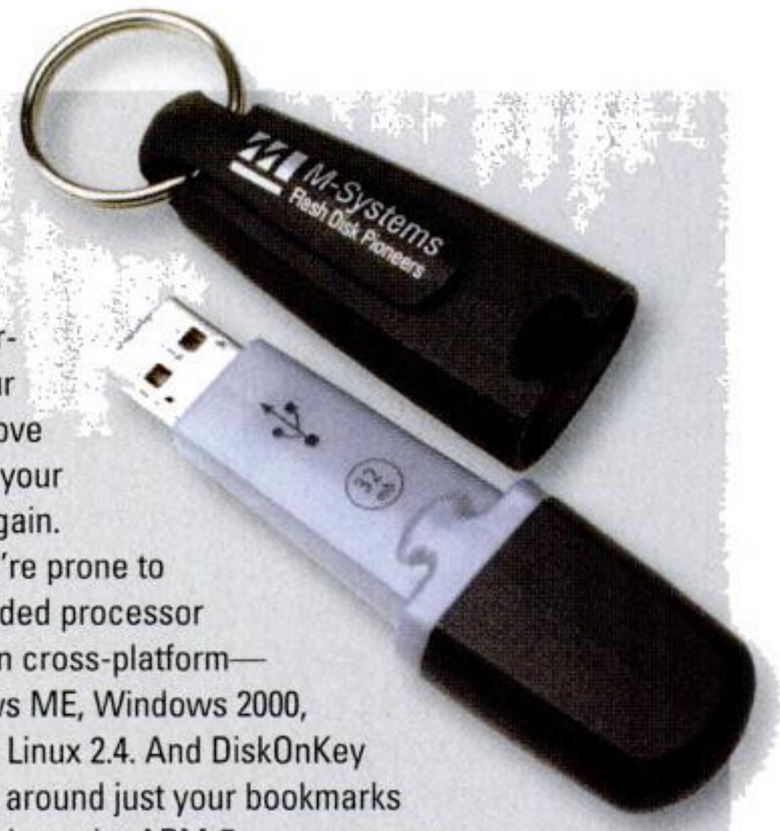
WHAT WE HATE: Deep bass is fine and dandy, but we'd like a little more than muddled treble along with it. Then there's the anemic positional response (which turned the directional arc of the *JFK* assassination scene into an audio nebula), the dubious 106dB volume rating that just doesn't sound that loud, numberless level knobs, the omission of mounting brackets for the satellites, and insufficient lengths of wiring. We could go on and on.

—EDWARD CHAMPION

MAXIMUM PC VERDICT: 4

$60, Altec Lansing, www.altecmm.com, 800.258.3288

DiskOnKey



The DiskOnKey is essentially a 32MB flash memory chip attached to a USB interface. Stick the device in your USB port, load up files, remove the device, then attach it to your keychain until you need it again. Simple, yes? Well, not if you're prone to losing your keys! An embedded processor allows the device to function cross-platform—without drivers—in Windows ME, Windows 2000, Windows XP, Mac OS9, and Linux 2.4. And DiskOnKey doesn't limit you to carrying around just your bookmarks and corporate secrets: Thanks to the ARM-7 processor, you can even run applications and boot your computer directly from the device. In our tests, transfer rates topped out at 922KB, which isn't bad for a keychain.

WHAT WE LIKE: Driverless, cross-platform operation puts the *moveable* in removable storage.

WHAT WE HATE: For Windows 9x, DiskOnKey needs special drivers. Though M-Systems plans to ramp up to 512MB during the next year, you can only get 32MB right now.

—LOGAN DECKER

MAXIMUM PC VERDICT: 8

$100, M-Systems, www.m-sys.com, 510.494.2090

DSP-100 PC Headset

Plantronics definitely knows telephone headsets. The company sells more headsets than any other vendor. Meant for busy corporate offices, Plantronics headsets have noise-canceling microphones and crystal-clear earpieces that fend off background chatter. The DSP-100 PC headset is no different. Since it's made for a PC, it also comes with a suite of bundled applications: *L&H VoiceXpress* for speech recognition, *Net2Phone*, *Roger Wilco*, and others.

WHAT WE LIKE: Sturdy but feather-light, the DSP-100 won't make your temples raw after a long night of multiplayer gaming. The boom microphone comes with a windscreen to eliminate breath rattles.

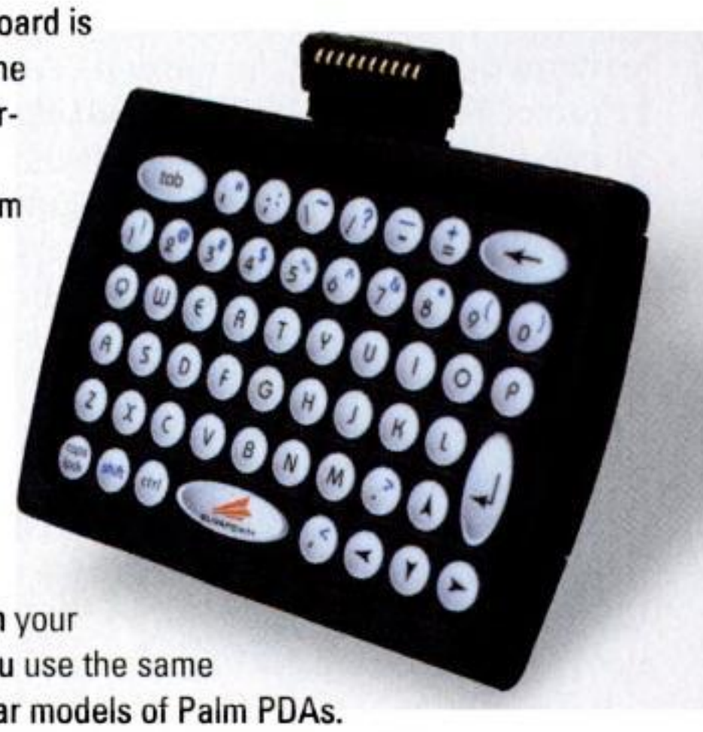
WHAT WE HATE: Spotty device drivers can turn a simple attempt to dictate an e-mail message to your computer into an exercise in frustration. Windows 2000 has trouble identifying the correct five drivers on the initial install, and on reboots, the OS sometimes can't find the device drivers again. Plus, USB Audio is *lame*.

—ROB PRATT

MAXIMUM PC VERDICT: 5

$60, Plantronics, www.plantronics.com, 800.288.0041

Fellowes PDA Pocket Keyboard



Fellowes' new PDA Pocket Keyboard is the first Lilliputian keyboard for the Palm. The keyboard uses an interchangeable module that lets it work with both Palm IIIc and Palm VII-type connectors, as well as Palm Vx. Setup is a snap—load the keyboard app and thumb-type away. A stand for the PDA cleverly folds into the back of the unit.

WHAT WE LIKE: The Pocket Keyboard's onboard batteries ensure minimal power drain from your PDA. The snap-in modules let you use the same keyboard on the two most popular models of Palm PDAs.

WHAT WE HATE: Don't be fooled, this isn't even close in functionality to the excellent Stowaway folding keyboard from ThinkOutside. In fact, the Pocket Keyboard's size makes it all but useless to anyone with fingers bigger than a French fry.

—GORDON MAH UNG

MAXIMUM PC VERDICT: 5

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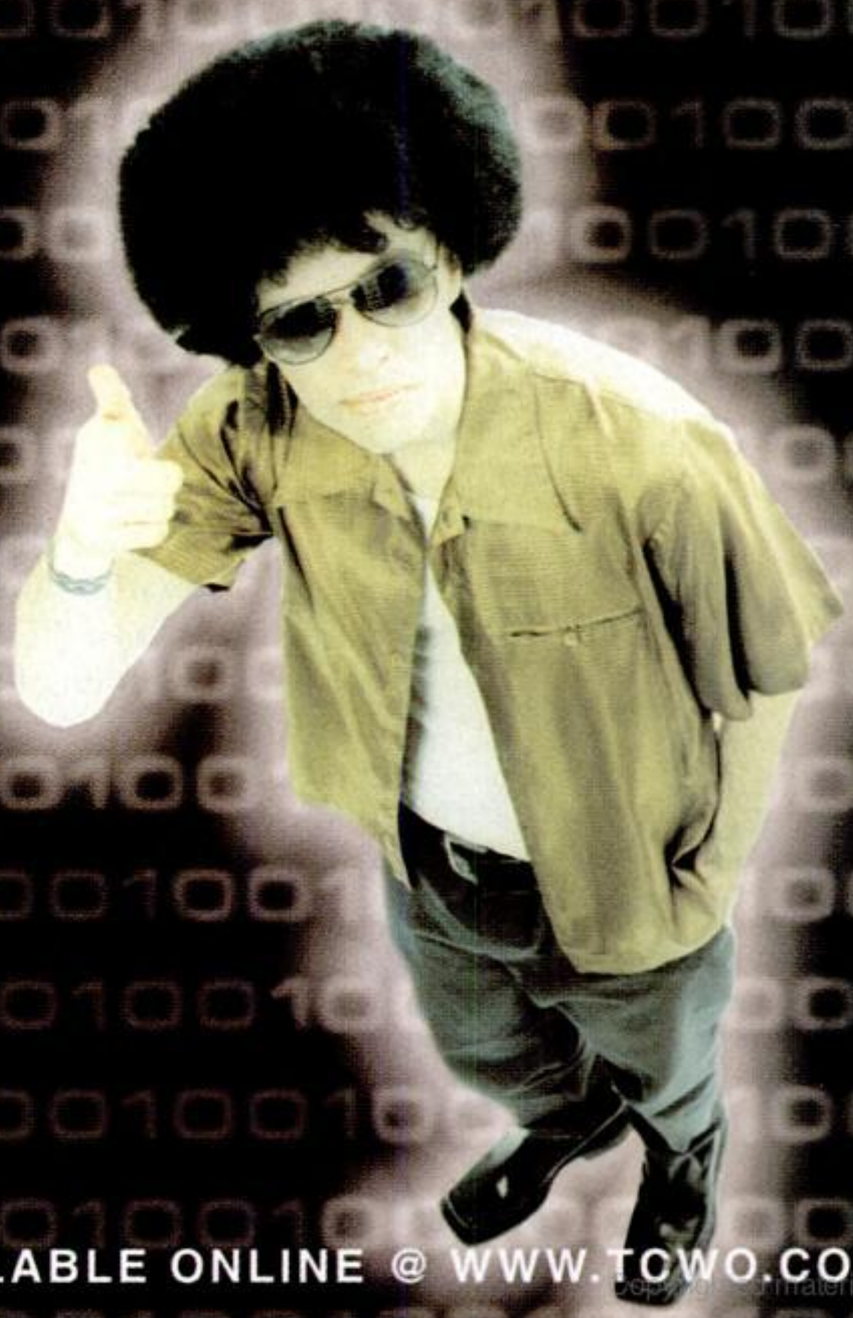

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Microsoft Train Simulator

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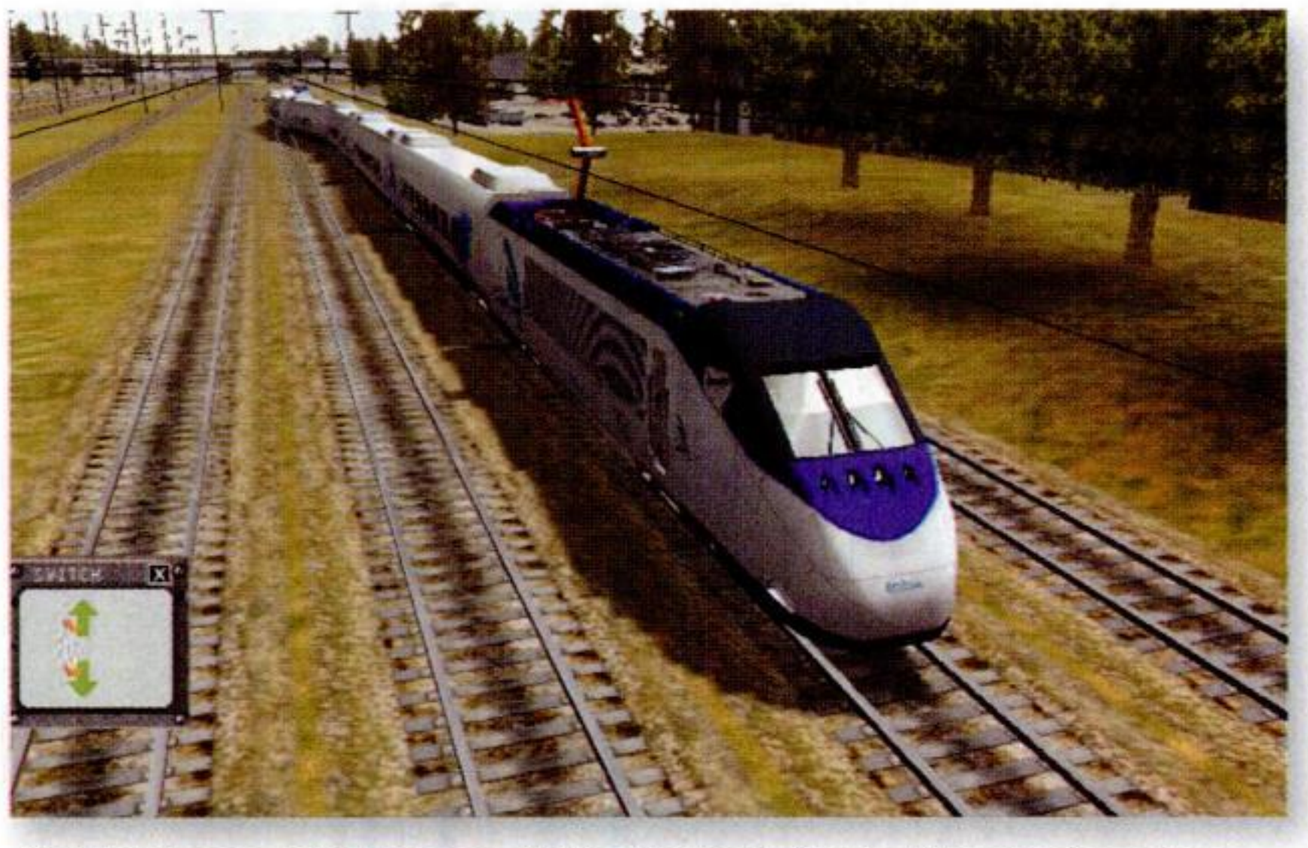

"I think I can, I think I can..." The Amtrak Acela, America's not-so-swift "high-speed" train, is among several models included.

Like its big brother, *Microsoft Flight Sim, Train Simulator* is for specific tastes. If the notion of operating an airplane without shooting at live targets seems like a pointless exercise, so will driving a lumbering, unsteerable vehicle over miles of fixed track. And if that's your first thought when you see a title like this, then you're not the intended audience. So go away. Shoo.

Those of you still reading are probably, on some level, into trains. If you're a man and have never been into trains—even on the Gomez Addams model-train-wreck level—then you're a little bit suspect. Trains are inherently wonderful: large, heavy, powerful machines that, unlike cars or even small airplanes, we'll never get to operate in real life. There's an undeniable allure to rail travel, as these beasts thunder through cities and rugged wilderness. *Train Sim* captures all this perfectly, bridging past and present, and spanning the globe with a surprisingly full package. It revels in the little details associated with running a diverse array of trains in very different environments. Like *Flight Sim*, it focuses on recreating the experience, the precise mechanics, and all the little procedures and protocols involved in driving a train engine. No detail is too small.

Panel precision: Cabs in *Microsoft Train Sim* are accurately modeled, so if you ever find yourself inside a *real* runaway train, you'll know what button to hit to engage the brakes.

If you're not a train enthusiast, all of this may seem, well, a little dull. Driving a bulky object along a fixed track without any particularly exciting events occurring, or even a need to steer, may not seem like a recipe for excitement. To the rail fan, however, it is a gold mine of details and challenges that effectively evokes a cherished experience. It's all here. Just to start a train moving takes myriad steps. In a steam engine, you check boiler water level, set the reverser to zero, close the regulator, open the cylinder cocks, move the reverse forward, open the regulator, release the breaks, watch the steam chest pressure gauge, close the cylinder cocks, reduce the cutoff, and trim the regulator for desired speed. You don't have to use this much detail, but it's part of the fun. There are realism settings, so on the least-real level, for example, Mongo can just make choo-choo go and watch the cows pass by.

And there is no shortage of cows, as well as cars, buildings, mountains, and other striking scenery. Six different routes are included, recreating a 15-mile wide swath of terrain around the trains. The Marias Pass in Montana, the Northeast Corridor (from Philadelphia to D.C.), the Odakyu Electric Railway and the Hisatsu Line in Japan, the Flying Scotsman line of 1920s England, and the Venice Simplon Orient Express of the 1930s offer some 600 miles of total trackside scenery, complete with accurate elevation and terrain data. The visuals are superb, with very precise train models, striking landscapes, and plenty of viewing angles. A track editor is included, allowing you to alter routes and layouts.

The train selection is very good, but more would have been nice, particularly since there's no locomotive editor. There are steam (the Flying Scotsman and the Golsdorf 380), diesel (the Dash 9, GP38-2, and KHA 31), and electric (the Amtrak Acela and the Odakyu 2000 and 7000 LSE) trains included, each with realistically modeled controls and cabs. There's also quite a bit you can do with all these trains. Within exploration mode, you can just drive along ogling the scenery. You can also follow time tables for picking up passengers, pick up and drop off freight, couple and uncouple cars, refuel, and more. Specific activities are offered, including timed challenges, and others can be custom-created or downloaded. If there's something a train can do, and if there is some button or lever needed to do it, *Train Simulator* has it, and that's all the recommendation train buffs will need.

—THOMAS MCDONALD

MAXIMUMPC VERDICT

Train Simulator
MICROSOFT

WHAT WE LIKE

Detailed simulation elements and gorgeous scenery will keep train buffs yanking levers, eyeing gauges, and watching the cattle herds go by for hours.

WHAT WE HATE

There's nothing to shoot, and you're pretty much stuck traveling where the rails take you. So, if you're not interested in trains, there's not much in *Train Sim* to interest you.

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7

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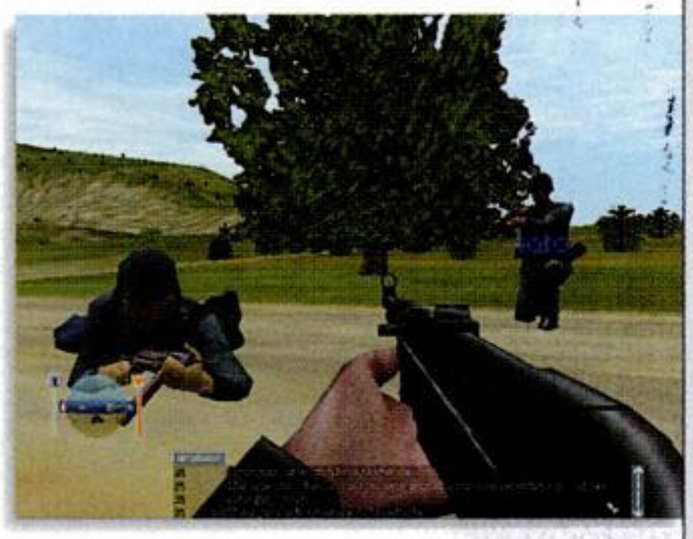
Around the World

Worms world, another world, World War II, and the underworld

World War II Online



Lots of PC gaming titles have claimed to integrate genres, but *World War II Online* truly delivers. *WWIIO* sets up a massively multiplayer, half-scale simulation of the WWII battle for Western Europe. Like first-person shooters? You can play as a soldier. Prefer realtime strategy? Work your way up the command structure to gain responsibility for posting missions and managing resources. Fond of flight sims? Hit the air in one of the classic fighters or bombers from aviation's golden age.

WHAT WE LIKE: The realism is astounding, and the action is intense.

WHAT WE HATE: *WWII Online* is a resource hog that chugs on systems with anything less than 256MB of system memory, a 1GHz processor, and a GeForce2-based videocard. Even then, you'll have to wait weeks and possibly months until the game's developers finish building the strategic system and knitting all the game servers into one persistent-state world.

—ROB PRATT

MAXIMUM PC VERDICT: 5

$40, Cornered Rat Software/Strategy First Games, www.wwiionline.com, 514.844.2433

Hostile Waters: Antaeus Rising

Hostile Waters isn't your typical RTS game. It features genre-standard concepts such as resource gathering, map revealing, and lots of combat, but the game is presented in gorgeous 3D and is bolstered by a wonderful sci-fi tale penned by comic-book innovator Warren Ellis (*Transmetropolitan*). The action takes place in 2032 on and around a chain of Pacific Ocean islands; you struggle to gain control of these islands by gathering energy and scrap metal to build your fleet. Consider it a watery successor to classics like *Battlezone* and Microsoft's now-forgotten *Urban Assault*.

WHAT WE LIKE: Ellis' comic-book touches show up in the attractive graphics and new twists on the realtime strategy formula. It's fun as hell to personally lead the action of your own fleet. The gripping story is loaded with good plotting and good writing.

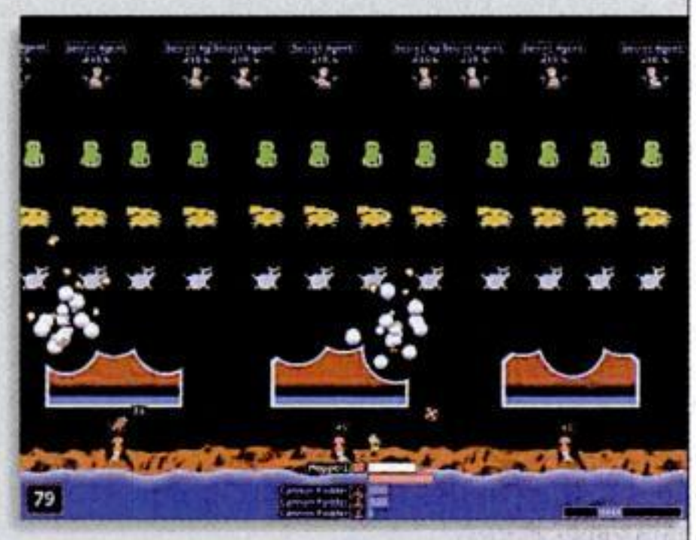
WHAT WE HATE: We experienced some slight control problems with the vehicles. Sadly, there are no multiplayer options whatsoever.

—ANDREW S. BUB

MAXIMUM PC VERDICT: 7

$40, Interplay, www.interplay, 800.468.3775

Worms World Party



Yes, it's the same *Artillery Duel-Scorched Earth* game that people once wrote in BASIC to impress and amuse their Apple II-fanatic friends. Yet *Worms* has always stood for something more, from the exploding sheep and hazardous donkeys to the shrill little voices of the dying earth-turners.

WHAT WE LIKE: Fast-starting games for one to six players keep the mayhem moving. The graphics are as garish as ever, but, with resolutions up to 1024x768, they're also pleasingly slick and smooth. Tons of voice options keep you from getting tired of the same old *Worm*-song. The computer can still accomplish ridiculous trick-shots, but that's a good thing—it keeps you coming back for more.

WHAT WE HATE: The selection of weaponry is getting entirely too complex for timed rounds. *Worms* promised to be the anti-*Lemmings*—featuring creatures that exist to wreak destruction and death, not to solve cooperative puzzles—so the mission mode, which involves set tasks as opposed to rampant destruction, feels out of place.

—JASON COMPTON

MAXIMUM PC VERDICT: 8

$30, Titus Interactive, www.titusgames.com, 818.709.3692

Gangsters 2

Gangsters 2 coulda been a contender! The idea of a strategy game based on 1930s mobsters seems a natural, but this overly simplistic sequel to the overly complex original just shoots blanks. You start each linear scenario with a few businesses (some legit, some not) and a gang of hoods you can send 'round to muscle new territory, create new rackets, and protect you from enemy gangsters. Since the campaign is built around a revenge tale, you'll also always have someone to whack.

WHAT WE LIKE: The concept is brilliant. Make crime pay, make like Bobby DeNiro in *Godfather II*, or sleep with the fishes.

WHAT WE HATE: The game lacks personality, the controls are too simple, and the action gets repetitive very quickly. The graphics are stylistic but poorly animated. The combat can be fun in certain scenarios, but you don't have any refined control over your hoods.

—ANDREW S. BUB

MAXIMUM PC VERDICT: 5

$40, Eidos, www.eidos.com, 888.900.6996

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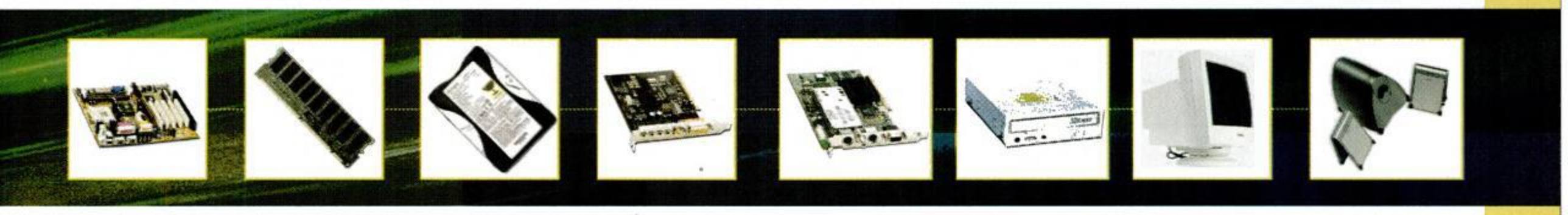

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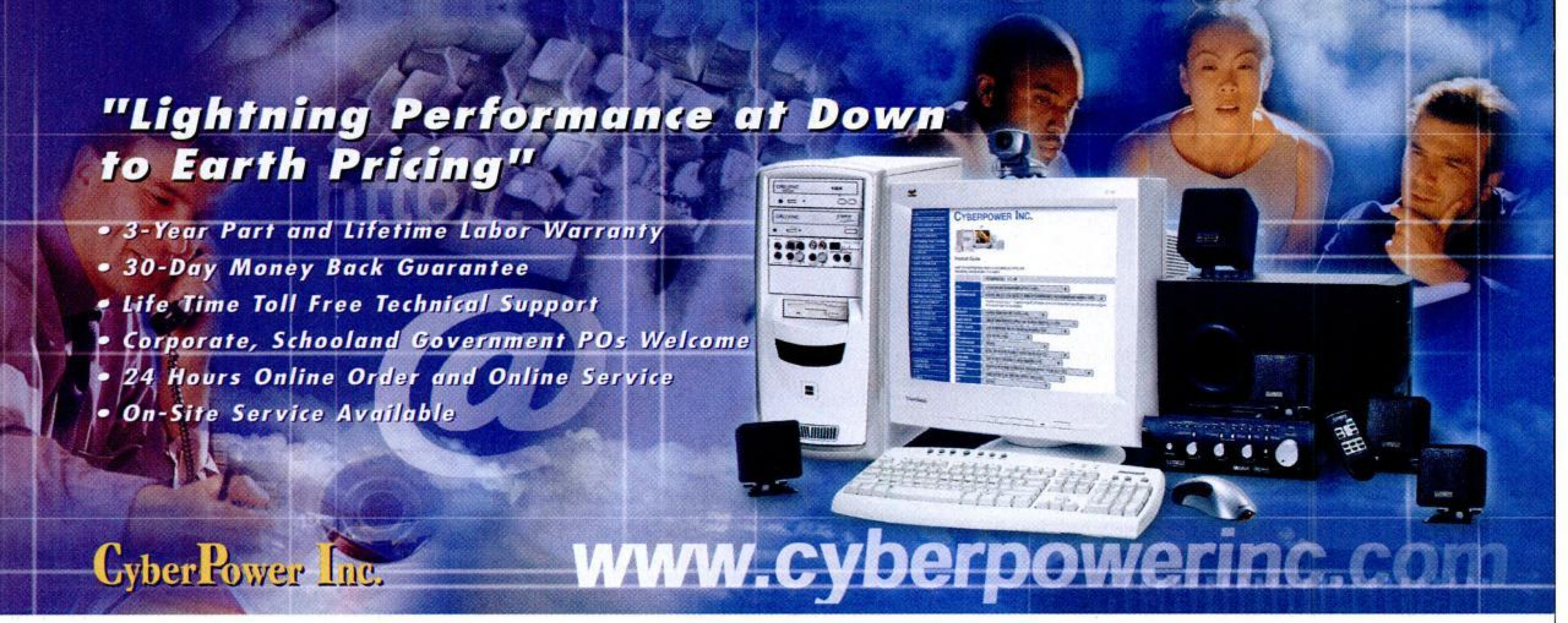
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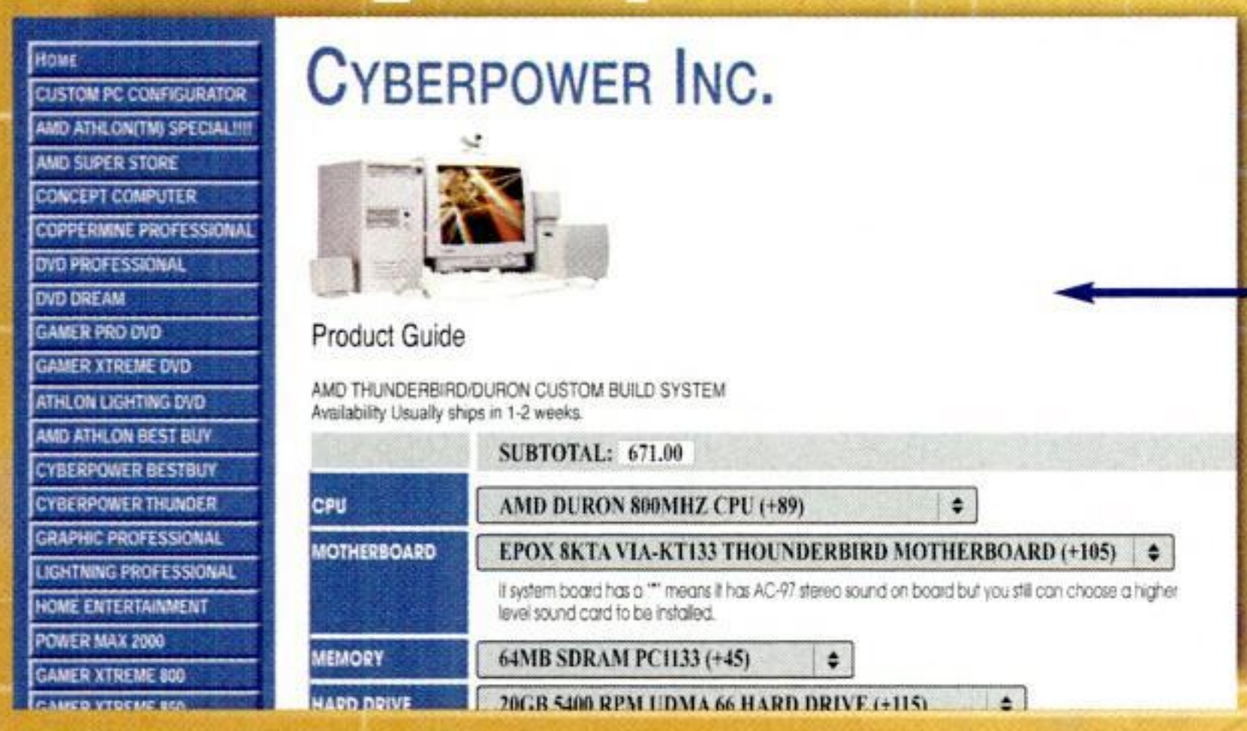

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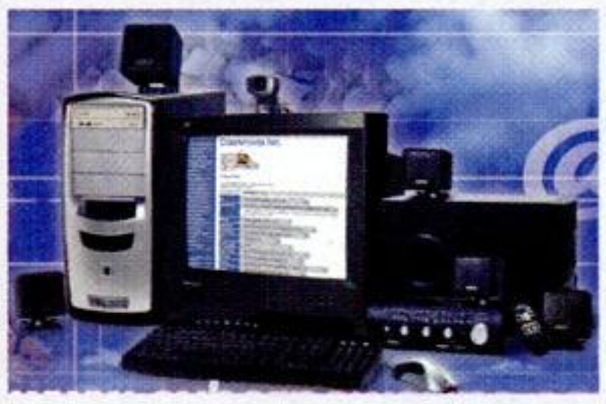

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40GB	7200rpm	AS040A4	$137
60GB	7200rpm	AS060A6	★ $198
MAXTOR			
10GB	7200rpm	5T010H1	$80
20GB	5400rpm	2B020H2	$84
20GB	7200rpm	5T020H2	$96
30GB	5400rpm	4W030H2	$99
40GB	5400rpm	4K040H2	$110
30GB	7200rpm	5T030H3	$118
40GB	7200rpm	5T040H4	$138
60GB	5400rpm	4K060H3	$170
60GB	7200rpm	5TO60H6	$199
80GB	5400rpm	4K080H4	$239
100GB	5400rpm	4W100H6	★ $289
SEAGATE			
10GB	5400rpm	ST310211A	$71
20GB	5400rpm	ST320413A	$85
20GB	7200rpm	ST320414A	$100
30GB	5400rpm	ST330621A	★ $93
30GB	7200rpm	ST330620A	$113
40GB	5400rpm	ST340823A	$105
40GB	7200rpm	ST340824A	$135
60GB	5400rpm	ST360020A	$162
80GB	5400rpm	ST380020A	$227
IBM			
20GB	7200rpm	07N6652	$100
30GB	5400rpm	07N3925	★ $98
40GB	5400rpm	07N3926	$104
40GB	7200rpm	07N6654	$134
60GB	7200rpm	07N6655	$203
75GB	7200rpm	07N3935	$259
SAMSUNG			
20.4GB	5400rpm	SV2042H	$83
30.6GB	5400rpm	SV3063H	$95
40GB	7200rpm	SP4004H	$135

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20GB	IBM	9.5mm	07N4388	$140
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12x8x32	IDE	Acer CDRW1208A	$112	$152
12x10x32	IDE	Pacific Digital U-30104	$114	$154
12x10x32	IDE	Lite-On	$102	$142
12x10x32	IDE	Creative Labs CDB121032	$126	$166
12x10x32	IDE	Plextor PX-W1210TA/SW	$170	$210
16x10x40	IDE	Pacific Digital U-30105 ★	$135	$175
16x10x40	IDE	Yamaha CRW2100EZ	$188	$228
16x10x40	IDE	Plextor PXW1610TA	$204	$244
16x10x40	IDE	TDK VeloCD 161040	$185	N/A
16x10x40	IDE	HP SureStor HP9700I	$168	$208
20x10x40	IDE	Yamaha CRW2200EZ	$225	$265
24x10x40	IDE	Pacific Digital U-30106	$199	$239
24X10X40	IDE	Plextor PXW2410TA/SW	$259	$299
12x10x32	SCSI	Plextor PXW1210TS/SW	$269	$309
16x10x40	SCSI	Yamaha CRW2100SZ	$255	$295
DVD Drives				
16x/40x	IDE	Pioneer DVD Tray or Slot	$75 ★	$100
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18.4GB	10,000rpm	KW018L2	8mb	$230
36.7GB	7,200rpm	XC036L8	4mb	$344
36.7GB	10,000rpm	KW036L4	8mb	$440
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18.4GB	7200rpm	ST318417W / N	2mb	$195
18.4GB	7200rpm	ST318437LW	2mb	$179
18.4GB	15,000rpm	ST318452LW	8mb	$338
36.7GB	7,200rpm	ST336737LW	2mb	$329
36.7GB	15,000rpm	ST336705LW	8mb	$558
181.6GB	7200rpm	ST1181677LW	4mb	★ $1484
IBM				
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	KK266	$120	KK266RAID	$135
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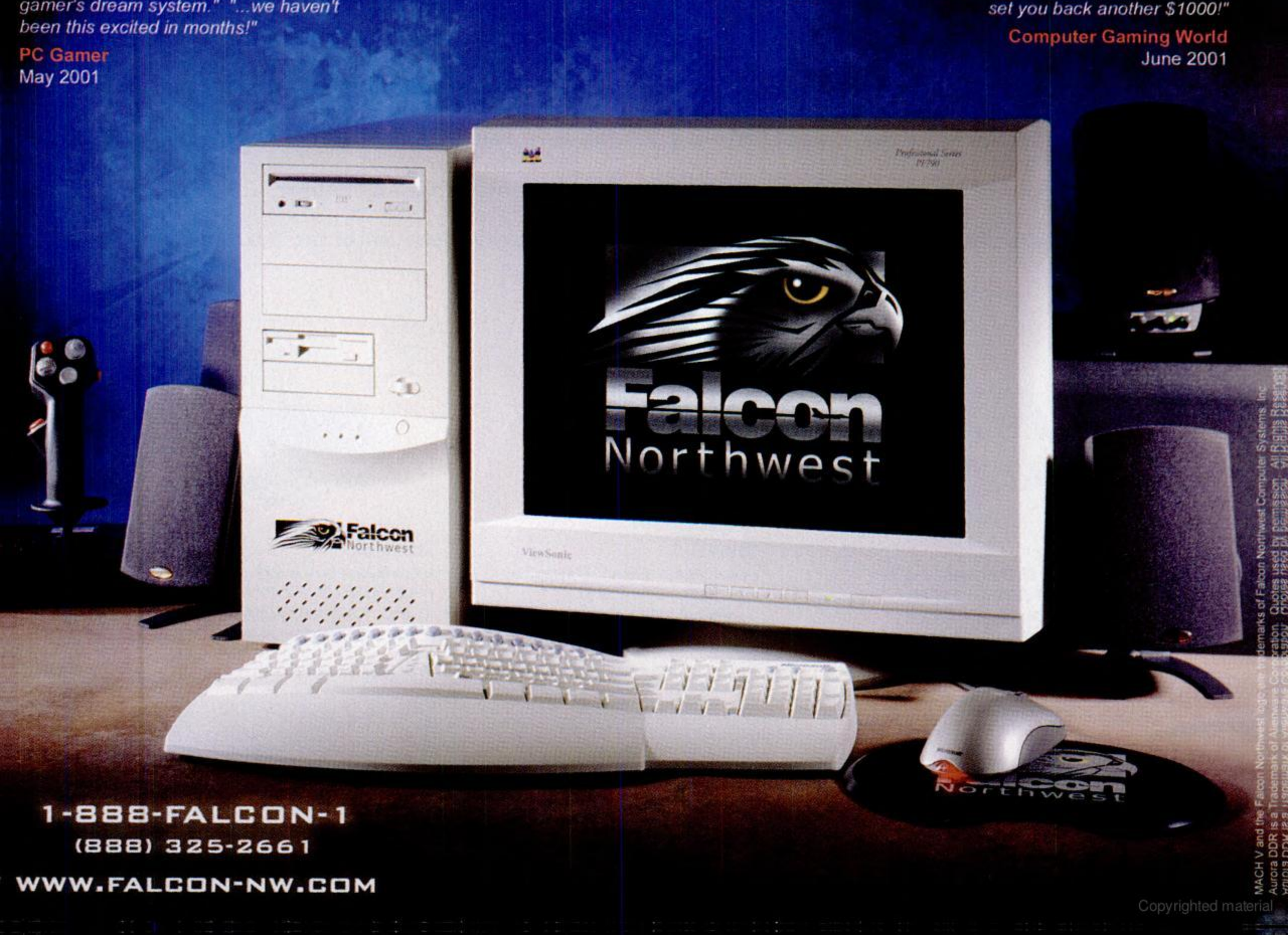

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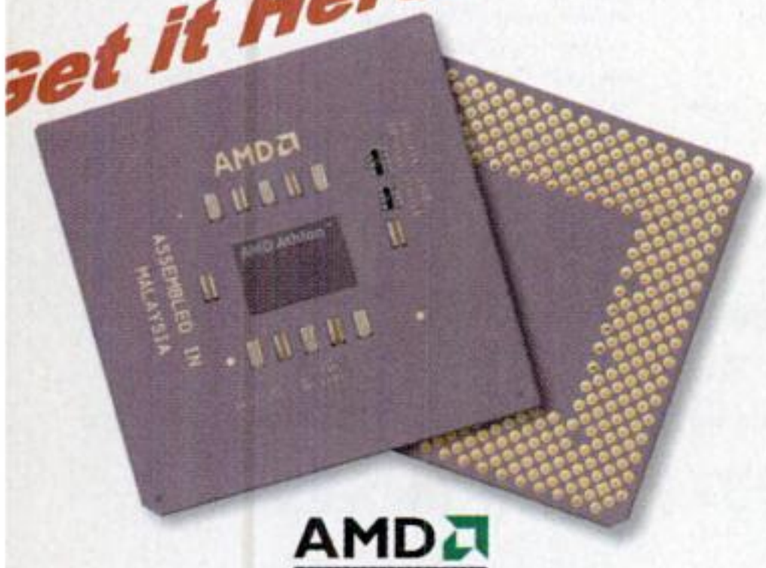

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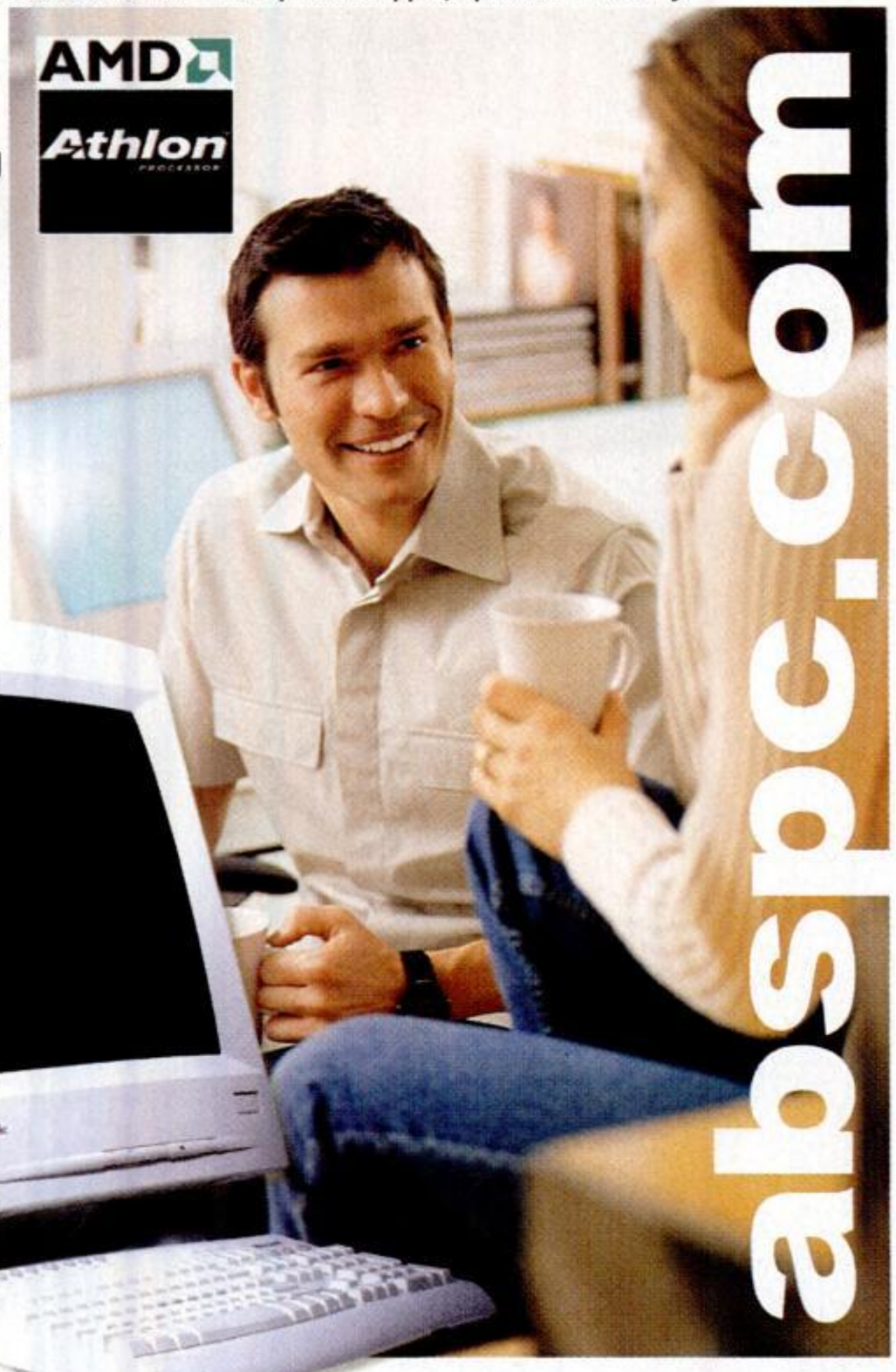

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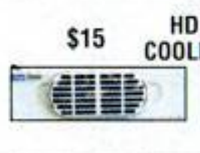

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104NLXBX slot 1	460	11.2x13.5x3.4	PS2 KB,mouse,VGA,USB,RJ45 2S,1P,AUDIO,GAME	w/FD & Slim CD		2/1	or 1
105LPX socket 370	375	11.9x12.6x3.4	PS2 KB,mouse,VGA,USB,RJ45 2S,1P,AUDIO, GAME, IR	1	1/1	2	0
106 socket 7	260	12.4x14.5x3.4	PS2 KB,mouse,VGA,USB,RJ45 2S,1P,AUDIO, GAME	1	1/1	2	or 0
108NLX socket 370	375	12.4x14.5x3.4	PS2 KB,mouse,VGA,USB,RJ45 2S,1P,AUDIO,GAME, IR	1	1/1	2	or 1
192 370/II Micro ATX	220	12.1x16.5x3.5	PS2 KB, mouse, VGA,2S,1P,AUDIO	1	1/1	2	& 0

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R04B/W	275	19x24.3x3.5	ATX	1/0	1/3		250W
R05B	260	19x19.5x3.5	ATX	1/0	1/2		250W
R06B	250	19x20.2x5.25	ATX	4/0	1/5		300W
R08 B/W	1550/1800	19x22x3.5					
R10 B	175	19x17x7	ATX	3/0	1/1		300W
R14 B/W	215	19x21x7	B/ATX	3/0	1/3		300W
R15	295/510	19x24.4x7	ATX	6/0	2/2		300W
R16 B/W	225	19x18x7	B/ATX	3/0	1/2		250W
R20 B/W	275	19x20.5x7		8/0			300W
R21 B/W	275	19x18x7		8/0			300W
R22R/B/W	635/950	19x23.3x10.5	ATX	8/0	1/0		300W/R
R26R/B/W	630/850	19x22.6x10.7	ATX	4/0	2/4		300W/R
R28	290	19x17x8.7		8/0			300W
RSP	18	5.8x9.3x1.6			1		
RSM169-100	65/75	5.8x9.3x1.6			1		
001B	75	10x11.5x3			1/0		60W
001B1	65	8.3x10.6x2.8			1/0		50W
002B	88	6.9x14.6x5.8			2/0		60W
002B1	78	7.5x11.2x6.5			2/0		80W
004B	105	6.8x15.3x9.3			4/0		230W
004B1	100	7.5x17.3x10.2			4/0		200W
007B	180	7x15.8x13			7/0		250W
008B	280	8.4x20.2x18.3			8/0		300W
008B1	180	7.5x17.9x17.1			8/0		250W
105LPX/TV	255/275	11.9x12.6x3	LPX	1/0	1/1		90W
109(SP 98) bare	175	11x13.6x3.4	NLX	1/0	1/1		135W
111N bare	260	11.6x10.6x2.5	M.NLX	1/0	0/1		100W
192M.ATX/B	85	13.1x16.5x3.5	M.ATX	1/0	1/1		150W
224	75	17.4x18.8x6.1	ATX	3/0	2/2		230W
267	70	16.8x16.8x6.2	ATX	2/0	2/1		250W
271	85	17.3x15.9x5.5	ATX	2/0	1/1		250X
288	75	16.9x17x6	ATX	3/0	2/1		230W
325B	55	8x18.5x17	ATX	3/0	2/1		235W
327	72	7.5x16.5x17.3	ATX	3/0	2/2		230W
337	75	7.8x18.8x16.5	ATX	3/0	2/2		300W
338	55	7x14.7x13.8	M. ATX	2/0	2/1		145W
366	50	7.2x15.5x14.3	M. ATX	2/0	1/1		235W
367	55	7.7x16.5x17	ATX	3/0	2/1		235W
370	80	8.3x17.3x16.1	ATX	3/0	2/2		250W
392	80	7.5x17x17	ATX	3/0	2/2		250W
393	90	9x17.5x17.5	ATX	6/0	1/1		250W
396	55	8.3x17x15.5	ATX	3/0	1/3		230W
401	110	8.5x17.3x18	ATX	2/0	2/2		250W
408	80	8.2x19.8x18.4	ATX	3/0	1/5		250W
409	295	9.5x22x18.1	ATX	4/0	2/5		300W
411	67	7.2x17.2x16.8	ATX	4/0	2/1		250W
412	67	7.2x17.2x16.8	ATX	4/0	1/2		250W
413S/BL	67	8.5x19.5x18	ATX	4/0	2/1		250W
415	75	8.8x19.5x19.7	ATX	8/0	1/0		300W
422	70	7.7x16.6x18.1	AT	4/0	1/4		250W
424	70	7.5x18.9x16.7	ATX	4/0	2/1		250W
426B/W/S	70/75	7.5x17.5x19.3	ATX	3/0	2/2		250W
427	75	7.5x16.5x17.3	ATX	3/0	2/2		250W
436	70/85	8.6x18x15.6	ATX	3/0	2/2		250/300W
455	110	8.5x17.5x18.6	ATX	4/0	2/3		250W
465	185	9.3x17x17.2	XEON/ATX	2/0	2/2		300W
467	75/90	7.5x16.7x18.8	ATX	3/0	1/4		250W/300W
470	110	8.3x17.3x21.3	ATX	4/1	1/2		250W
471	110	8.4x17.5x21.3	ATX	3/1	1/4		250W
472	60	7.5x18x17.6	ATX	4/0	2/2		250W
474	285	7.8x17.2x17.2	ATX	4/0	2/2		300W
476	70	8x17.2x17	ATX	4/0	2/2		300W
478	155	7.9x18.4x16.4	ATX	4/0	2/1		300W
479	155	7.9x18.4x16.4	ATX	4/0	2/1		300W
480	195	7.8x18x16.5	ATX	4/0	2/1		300W
482B	80	7.8x19.8x17.5	ATX	4/0	2/2		250W
486	67	9.6x19.5x17	ATX	4/0	2/1		250W
489**	80	7.3x17x17	ATX	3/0	1/2		235W
490	70	8.5x15.5x15	ATX	2/0	2/2		250W
491B	70	8.5x15.5x15	ATX	2/0	2/2		250W
496	60	8.25x17.8x16.5	ATX	4/0	1/3		250W
501	155	8.25x17.2x23.8	ATX	4/0	2/4		300W
503R/B	455	14.8x20.4x18.4	ATX	8/0	2/4		300RW
503/B	295	14.8x20.4x18.4	ATX	8/0	2/4		300W
505	555	14.6x23x26.8	ATX	12/0	1/8		300W
505R	670	14.6x23x26.8	ATX	12/0	1/8		300RW
506/R	155/370	7.8x16.5x24.4	ATX	6/0	2/2		300W/R
524	380	13.9x25.6x19.1	ATX	7/0	1/2		300RW
526B/W	105/120	7.5x17.5x24.5	ATX	6/0	1/4		250W/300W
528	95/110	7.5x16.5x24.8	ATX	6/0	1/5		250W/300W
536	93/108	7.8x17x24	ATX	5/0	1/5		250W/300W
538	290	8x20.5x24.5	ATX	5/0	1/6		300RW
560/R	290/445	15x24.5x23.5	ATX	11/0	2/4		300W/300R
562/R/B/W	250/470	8.7x17.9x26.8	ATX	9/1	1/0		300W/300R
563/RB/W	145/370	8.7x17.9x26.8	ATX	10/0			300W/300R
565	185	9.25x18.3x21.2	XEON/ATX	4/0	2/4		300W
568	95/110	7.5x17x22.8	ATX	5/0	2/4		250W/300W
569B/W	210	13.5x17.8x14	B/ATX	6/2	0/8		300W/300W
570/R	150/370	8.3x17.3x26.4	ATX	7/1	1/2		300W/300R
571/R	160/370	8.3x17.3x26.4	ATX	6/1	1/2		300W/300R
582	105/120	7.8x16.5x23.2	ATX	6/0	2/1		250W/300W
588	99/114	7.8x16.5x23.3	ATX	5/0	1/3		250W/300W
1620/R	950	16.5x20.3x34.3	F/ATXx2	16/0			300R

Model# Starts with:
1 for Slim Case
2 for Desktop Case
3 for Mini-Mid Case
4 for Mid Case
5 for Full/File Server Case

*Case Color: Blue, Purple, Green, Orange, Red.
**Case Color: Blue, Purple, Green, Red, Black.

Side Open: Side Panel can be removed independently
Slide Door: Sliding front door up and down
Slide MB Plate: Motherboard tray ca slide in and out form rear

MB SIZE = MOTHERBOARD SIZE • F= FULL SIZE • B= BABY SIZE
X=ATX • M. ATX= Micro ATX
R= REDUNDANT POWER SUPPLY WITH HARDSWAP
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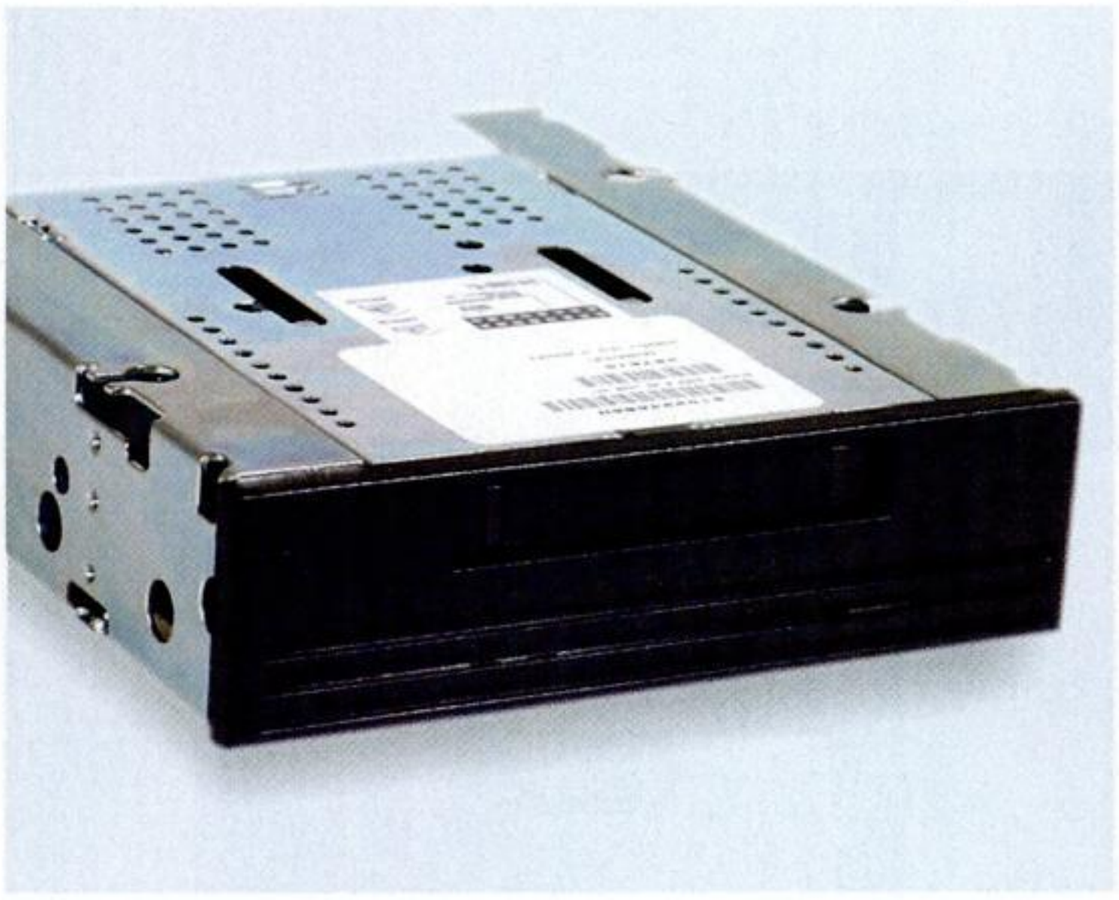

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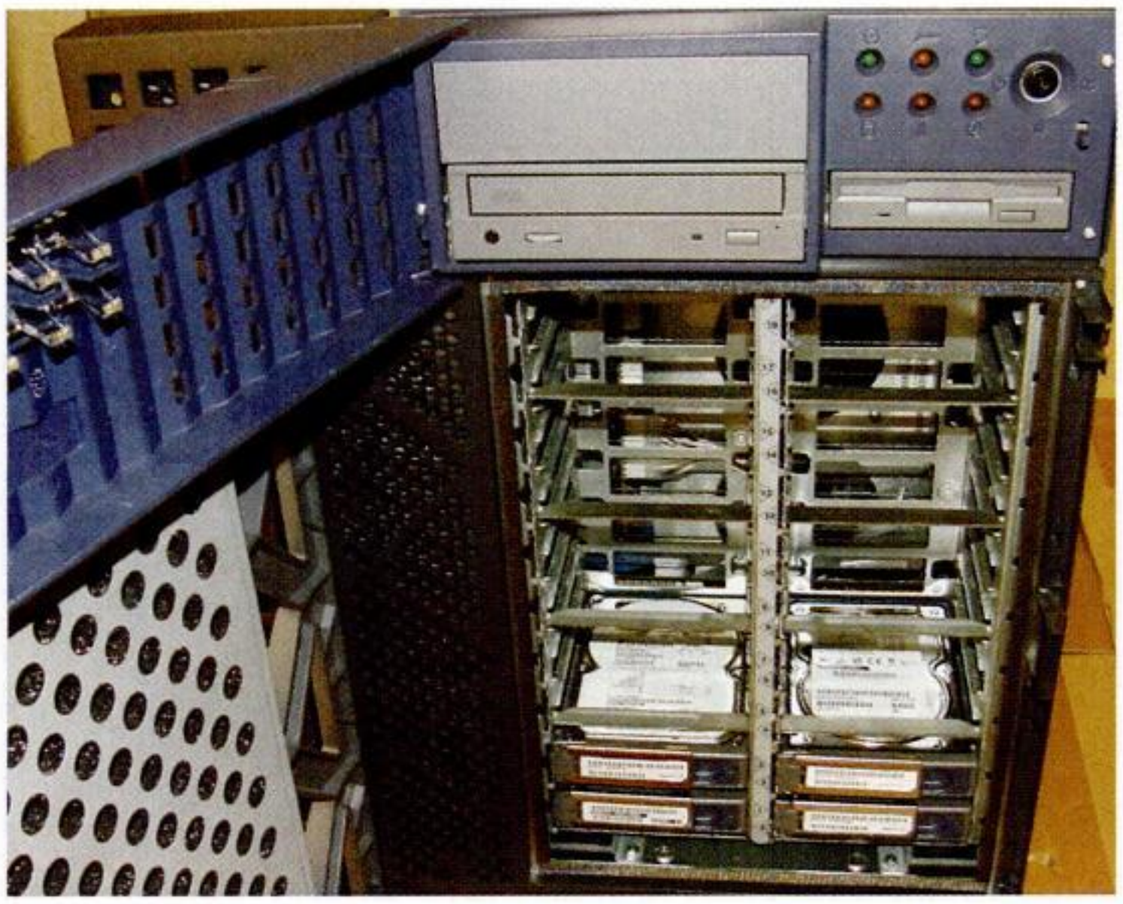

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- 56x CD-ROM Drive
- 56K V.90 Fax/Modem
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- Win98 Keyboard & Scrolling Internet Mouse
- 120 Watts PMPO Stereo Speakers
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- MS Windows ME CD - add $89
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- MS Windows ME CD & Manual - add $89
- 17" Digital SVGA Monitor, .27mm - add $155
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AMD ATHLON 900	**$ 439**	(bgsp093)
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- AC97 Stereo 3D Sound upgrade: Sound Blaster Live! Value @ $49
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AMD ATHLON 1.0 GHZ	**$ 639**	(abbsp093)
AMD ATHLON 1.1 GHZ	$ 649	(abbsp094)
AMD ATHLON 1.2 GHZ	$ 659	(abbsp095)
AMD ATHLON 1.33 GHZ	$ 669	(abbsp096)
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- 750 Watt PMPO Subwoofer Speaker System
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AMD ATHLON 1.1 GHZ	$ 709	(assp094)
AMD ATHLON 1.2 GHZ	$ 715	(assp095)
AMD ATHLON 1.33 GHZ	**$ 729**	(assp096)
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AMD ATHLON 1.33 GHZ	**$ 1495**	(nigsp094)
AMD ATHLON 1.4 GHZ	**$ 1525**	(nigsp095)
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$819 BACK TO SCHOOL

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- 19" Digital SVGA Monitor, .26mm
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- **Microsoft Intelli Mouse** & PS2 Win98 Keyboard
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AMD ATHLON 1.1 GHZ	**$ 1375**	(gdsp092)
AMD ATHLON 1.2 GHZ	**$ 1385**	(gdsp093)
AMD ATHLON 1.33 GHZ	**$ 1395**	(gdsp094)
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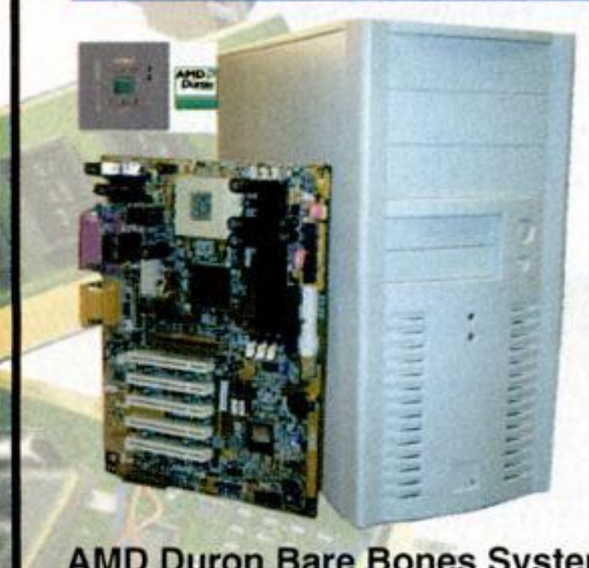

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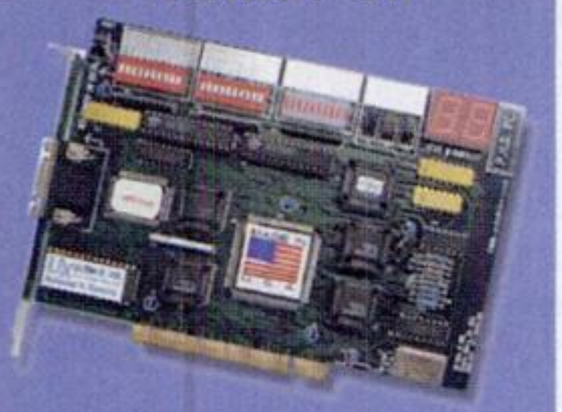

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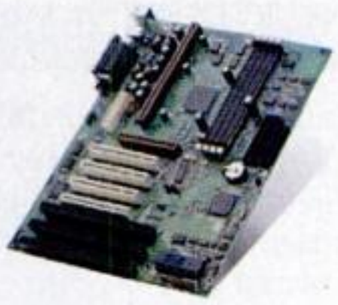

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Coming Next Month

IN THE MAXIMUM PC OCTOBER ISSUE!

Secrets of the Power-User Elite

If you're not interested in getting extra power, stability, and usability from your PC, this article will do absolutely nothing for you. But if you *are* interested in such tempting benefits, get ready to harangue your mail carrier until you receive the October issue. We've collected the best system tweaks from the world's geekiest power users—
and next month all those secrets will be in your hot little hands.

10 Things You *Must* Know About Windows XP

To upgrade or not to upgrade? We present the most crucial facts about Windows' biggest overhaul since 1995. How will Windows Product Activation affect you and your lifestyle? Will Windows XP eat your MP3s? Will your current settings and software be able to make the journey with you? We'll answer these
questions and more to give you the lowdown before you make the decision to upgrade.

A Maximum PC After-School Special: All About Firewalls

We all know we're supposed to use them, but most of us just don't bother. Please—we don't want to see you become an Internet victim. Be sure to show up for this very special episode on firewalls: what they do, how to configure them, what the differences are between hardware and software firewalls, and much, much more. You *can* save yourself...

How They Do That Voodoo That They Do (Reprise)

This time, we're not kidding. Scheduling issues delayed our look at Voodoo Computers' aesthetically amazing boxes, but in the October issue, we finally detail Voodoo's most marvelous interiors and speak with the master craftsmen who are responsible for those gorgeous wiring jobs.

material

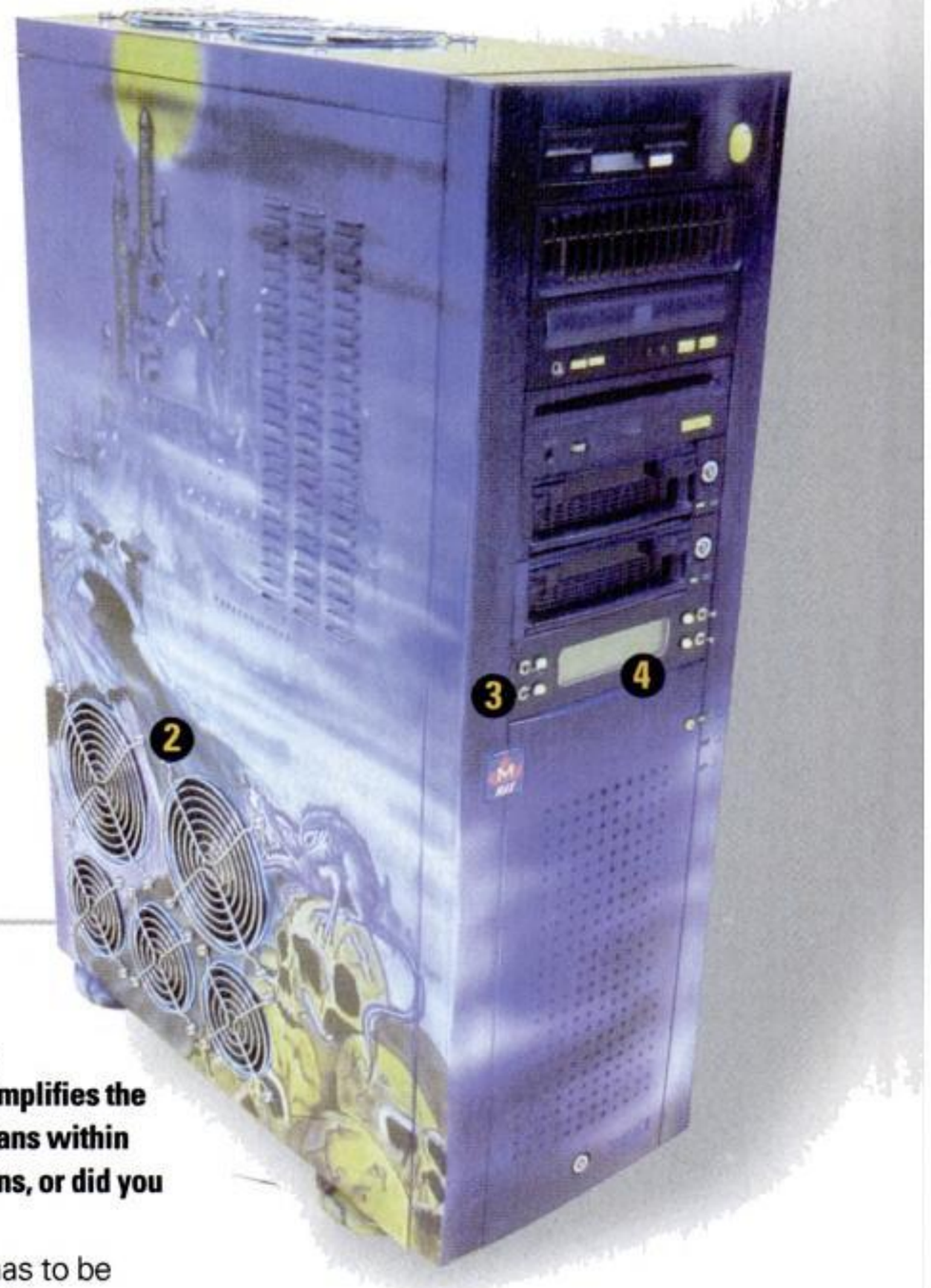
Rig of the Month

Hack, Solder, Paint

THIS MONTH: Tower of RagE

When A. Dale McLean—aka, "PS-RagE"—originally e-mailed his Rig of the Month submission, we damned him. "Damn you, RagE!" we cried. "Damn you and your bandwidth-clogging attachments!" His e-mail took so long to download, we thought the digestive tract of our mail server was obstructed by a big wooden canoe. Well, we were wrong. It turns out that RagE's ROTM candidate is so elaborately detailed, he couldn't convey the machine's majesty with just a single, low-bandwidth picture, so he sent us the whole proverbial highlight reel.

We're glad he did, because this rig has it all: extreme modifications to a Supermicro 750a server tower, an elaborate paint job, an LCD fanbus, and no fewer than 23 internal fans. You can read more about The Tower of RagE at **www.onlink.net/houseofrage**, but for now, we provide some interview highlights...



1 MAXIMUM PC: Does the case artwork bear special significance?

PS-RAGE: The artwork is from Nazareth's 1979 *No Mean City* album. I'd been using the skeleton dude with the straight razors as a logo in OGL for some time.

2 MPC: Does the case truly require that much cooling, or were you just having fun?

PS-RAGE: This case was built around everything I'd learned from building the last one—what worked and what didn't. Then I kind of amplified everything that did work. However, normally I run with only my primary intakes and exhausts on. That means that I turn on three 80mm side intakes, four 80mm intakes cooling the drive bays, the front-bay blower, and one 120mm YS-Tech, which performs exhaust duties in the back. Meanwhile, four of the 120mms and two 80mms are rarely used.

With just these fans running, my case temps are room-temperature—even after a full night of fragging. I have a thermal sensor attached to the wall outside the machine to measure the room's temperature. The only time I find it necessary to run the secondary intakes and exhausts is after I've shut down the other fans for a time—usually in order to talk to my wife (smiles). I designed this thing to be the meanest, loudest, air-cranking mofo going.

3 MPC: Please tell us about the hand-built fanbus [a device that simplifies the wiring and activation of multiple fans within a case]. Where did you get the plans, or did you design it yourself?

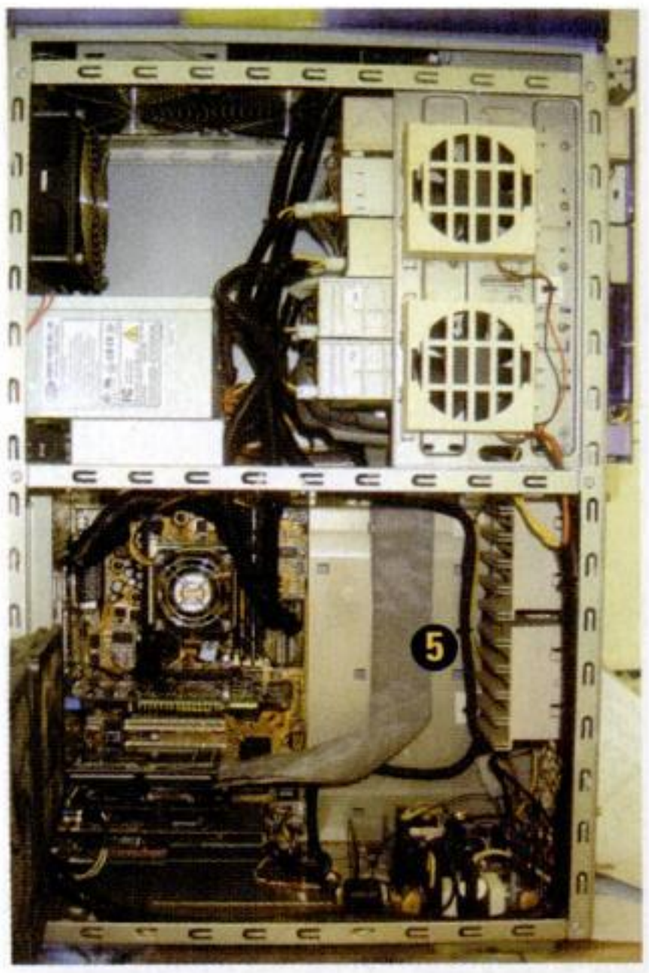
PS-RAGE: Any fanbus/baybus has to be credited to Cliff Anderson of Fanbus.com. The original concept was his. That said, however, I designed and built this one from scratch. The LEDs are bi-colored. When the switch is turned on, they change from red to green to indicate the status of the fan. Heh—like you can't tell from the sound.

4 MPC: You say your rig is running "Ryan 'Uller' Myers LCDriver." What exactly is this?

PS-RAGE: Ryan Myers is an active participant in the [H]ardlOCP Cool Cases Forum. He's a computer science student and a SysOp, and has contributed an incredible amount of his own time to help fellow case-modders with cool software-driven gizmos. The LCDriver is just that: a Windows driver for LCD displays. I'm using it to show *MotherBoard Monitor* stats, but it can display other things, like *Winamp* stats. It is free for download from **http://lcdriver.pointofnoreturn.org**.

5 MPC: A lot of cables seem to have been rounded or modified in some way. Details?

PS-RAGE: The ATA/33 and floppy cables have indeed been rounded. They and the power cabling are encased in wire loom. This is like a thin-walled, nylon, vacuum hose, split down the middle, used to protect cabling, typically in automotive or industrial applications. I use it mainly for looks, as it hides the gray ATA/33 cables and the multi-colored power runs. I tried to round the ATA/100 cables but they are just too stiff due to the wire density. I found it much more efficient and eye-appealing to just lay them flat against the case walls. ■



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- Upgrade Inspiron™ Notebooks with 1-Yr Ltd Warranty[2] and 1-Yr Mail-in Service to:
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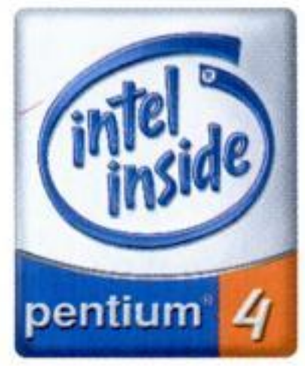
  - 3-Yr Ltd Warranty[2], 3-Yr Next-Business-Day On-Site Service[4] and 24x7 Lifetime Phone Support, add $219



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